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NCC '84: No big problems, no big surprises

By John Gallant
CW Staff

LAS VEGAS — The searing heat, the hype and the gaming tables have been left behind. Devoid of major problems — and product announcements — the 1984 National Computer Conference is just a memory now.

Most visitors and exhibitors interviewed agreed that this most recent Woodstock of the high-tech generation was well-coordinated by the American Federation of Information Processing Societies, Inc., the primary sponsor. Missing from this NCC were the nagging problems and ill will that marred the show in recent years. The steps taken by Afips to speed on-site registration, for example, appear to have worked. Although only about a quarter of the attendees took advantage of Afips' preregistration option, on-site sign-up went smoothly for most people, who spent a minimum of time (an average of 15 minutes) in the registration maze.

CW photo by D. Angell

They flocked to Las Vegas for NCC. See coverage inside.

Consistent with a policy initiated last year, a spokeswoman said Afips would not release attendance figures for the show. Many show exhibitors, however, felt attendance was definitely down compared with last year.

Afips declined to comment on how this year's crowd compared with those at previous NCCs. Independent attendance estimates were not available at press time.

The spokeswoman said Afips was "quite pleased" with attendance at the more than 90 technical sessions conducted this year, most of which were well-received by attendees interviewed by *Computerworld*. Just over 700 exhibitors used this Las Vegas forum to parade their existing wares.

While it will not be remembered for its shortcomings, this year's NCC will also not be recalled as a show in which major products were unveiled. Visitors hoping for new hardware and software announcements were, for the most part, disappointed; the show held few surprises.

Ironically, perhaps the most important new product introduction last week came from Prime Computer, Inc., which chose to sit out NCC. The company announced two superminicomputers (see story below).

On the hardware side, a plethora of peripherals and a handful of systems marked

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Prime unwraps 32-bit superminis

By Jeffry Beeler
CW West Coast Bureau

NATICK, Mass. — Prime Computer, Inc. last week retired two of its 50 series processors and replaced them with a pair of additional machines that reportedly provide up to 60% better price/performance than their predecessors.

Prime's 9750 and 9650 qualify as mid-range members of the 32-bit 50 series and replace the firm's existing Model 750 and Model 550-II processors, respectively, Prime said.

The 9750 provides 75% greater internal throughput than the 750 at a 12% to 15% higher price, for a net price/performance improvement of 60%, the company said.

The 9650, in contrast, outperforms the 550-II by 30% and costs 12% more, for an overall price/performance edge of roughly 25%, according to Prime.

Much of the 9750's and 9650's advantage in processing power over their 50 series predecessors reportedly stems from recent refinements to Prime's 32-bit architecture and from the adoption of improved circuitry.

Unlike the processor it replaces, the 9750 embodies a five-stage pipeline architecture, which, in essence, allows the machine to execute five instructions concurrently in parallel. The medium-scale CPU also incorporates emitter-coupled logic circuits, which operate twice as fast as the transistor-transistor-logic components that formed the guts of the 750, the company said.

Like the Model 750, the just-retired 550-II was built around TTL devices — a feature it shares with its replacement,

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TOP OF THE NEWS

Promises, promises. That's what AT&T gave the Federal Communications Commission in response to its steadily growing private-line order backlog. The promise? That AT&T will begin reducing the backlog around Labor Day. **Page 2.**

■

"We obviously did not have our act together." That's the way Jim Renier, Honeywell, Inc.'s vice-chairman of the board and president of the company's Information Systems Division summed up Honeywell's recent past. But he also said the company has learned from its mistakes. **Page 4.**

■

Future shock. The head of the Japanese supercomputer development project used the National Computer Conference to disclose information on a new processor and data base machine that his team has developed. **Page 7.**

■

A hardware main event, as usual. The National Computer Conference has traditionally been a forum for hardware announcements, and this year was no exception, although there were no big splashes. **Pages 10-11.**

■

Breaking up was hard to do. DP managers have had to make several adjustments to their ways of doing business in the wake of the AT&T divestiture. **Page 16.**

■

Continuing to expand, Cincom Systems, Inc. last week unveiled a series of Unix operating system tools and a Wang Laboratories, Inc. version of Cincom's Mantis fourth-generation application development system. **Page 22.**

■

Minis pass muster in Datapro survey

By Tom Henkel
CW Staff

DELRAN, N.J. — On the average, minicomputer users are not as pleased with their systems as are mainframe users. But they are generally pleased nonetheless, enough for almost 89% of users polled recently to say they would recommend their systems to others.

Asked in a recent survey by Datapro Research Corp. whether their systems lived up to their expectations, 92% of 1,975 minicomputer users polled said they did (see charts pages 23-25). The users surveyed represented 31 system models from 17 minicomputer manufacturers.

In an earlier survey [CW, July 9], Datapro asked the same questions of mainframe users. In that survey, 96% of mainframe users said their systems lived up to their expectations, and 92% were willing to recommend their systems to others. It should be noted, however, that the minicomputer survey covered nearly twice as many vendors' systems as the mainframe survey. The mainframe survey looked at 21 model classifications from 10 mainframe vendors, Datapro said.

In other survey results:

■ IBM scored some of the highest and lowest overall user satisfaction ratings. The firm's System/23 Datamaster received the lowest score of 2.67. However, the newly announced System/36 received one of the highest overall satisfaction ratings — 3.57. The ratings were based on a scale of one to four, with four being the highest possible rating.

IBM's 8100 distributed processing system received fairly positive reviews from six users polled. All six said they received what they expected, and all were willing

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NEWS

AT&T expects to trim private-line order backlog in fall

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T expects to begin reducing its private-line order backlog around Labor Day, according to Jim Byrnes, a company spokesman. His comment was made last week, shortly after AT&T, in a filing submitted to the Federal Communications Commission, reported an increase of more than 16% in the backlog between May 22 and June 22, together with a decrease in the percentage of orders completed on time.

The private-line backlog totaled 41,700 orders on June 22 vs. 36,000 a month earlier; orders completed on time declined from 23.2% to 22.8% during the same period.

In both cases, the changes continued trends that began some time earlier.

Estimate assumes extra order completions

Byrnes' estimate that the backlog will begin to decline around Labor Day assumes that AT&T and local telepone companies will complete more orders in September than are due to be completed that month. (The backlog equals the number of orders not completed "on time" — typically, within 45 days after receipt from the customer.) The number of orders completed has risen steadily in recent months — from 9,400 in March to 15,900 in June.

A communications attorney who represents remote-access data processing vendors and large corporate communications users contends that the backlog would be far less, and could be reduced far more quickly, if AT&T would provide order-tracing information to its customers. The result of not providing it, he said, is that a customer wanting to find out about the status of his order must talk only to AT&T, even if his question involves facilities supplied by a local telephone company.

According to the attorney, who asked for anonymity, AT&T gives each customer a transaction number, but gives each participating local telephone company a separate purchase-order number. AT&T allegedly refuses to disclose this latter number to the customer, so there is no way a customer can contact his local phone company about his order.

AT&T spokesman Byrnes confirmed that the customer receives a Universal Service-Order number and the local telephone company is given a purchase-order number. Asked whether the customer could obtain the latter number, Byrnes said, "It's not likely; the purchase-order number is part of our internal tracking system."

According to the figures AT&T supplied to the commission, the private-line order backlog amounted to 12,000 orders in February, the first month a backlog figure was reported, compared with last month's 41,700. Meanwhile, between January and June, the percentage of orders completed on time dropped from 54.1% to 22.8%.

Lack of standard form

Lack of a standard order form is one major reason for the problem, Byrnes said. Because local telephone companies have different information requirements, many private-line orders — known officially as access service requests — were rejected the first time AT&T submitted them, he said.

This problem should be eliminated shortly, Byrnes said. A standardized form, developed jointly by AT&T, which supplies the interstate portion of private-line service, and officials of the divested Bell operating companies has been tentatively approved; Byrnes expects it to be in general use by the end of September.

Next month, Byrnes added, AT&T plans to begin giving its private-line customers firm dates for completion of private-line orders. He explained that initially, the company will promise to complete an order within a specified time frame rather than on a specific date. Also, the program will be phased in gradually — only customers in certain areas, requiring service to certain other areas, will be covered at first.

PRIME from page 1

the 9650. But although the 9650 contains no ECL circuitry, the processor does reportedly boast a two-stage pipeline architecture and is based on the same customized gate arrays that Prime first used in another 50 series machine, the 2550.

Neither the two-stage pipeline architecture nor the customized gate arrays were present in the 550-II.

With the introduction of the 9750 and 9650 and the simultaneous retirement of their predecessors, the 50 series still consists of five models. In ascending order, the members of the product family are: the 2250, 2550, 9650, 9750 and 9950.

Thus, of the two latest additions to the company's processor line, the 9750 is clearly the more powerful. Prime characterizes the machine as belonging to the same product class as the Data General Corp. MV/10000, the Digital Equipment Corp. VAX-11/785, the Hewlett-Packard Co. HP 3000 Model 68, the IBM 4381 Model 1 and the Wang Laboratories, Inc. VS 300.

The 9650, by contrast, compares roughly in internal execution speed to DG's MV/8000 Model 2, DEC's VAX-11/780, HP's HP 3000 Model 48, IBM's 4361 Model 5 and Wang's VS 100, the company said.

A basic 9750 configuration requires at least 4M bytes of internal storage and expands in 2M-byte increments to a maximum of 12M bytes. When fully configured, the CPU model simultaneously supports as many as 128 users and 255 active processes, the company said.

The 9650 starts with 2M bytes of main memory and accommodates up to 8M bytes. In a maximum configuration, the machine supports as many as 96 simultaneous users and the same number of active processes as the 9750, Prime added.

Both the 9750 and 9650 reportedly also can be configured with up to 10G bytes of disk storage and provide an I/O bandwidth of 8M byte/sec and 5M byte/sec, respectively.

In addition, the two machines come with 16K bytes of cache memory and a built-in diagnostic processor subsystem, which promotes serviceability by allowing hardware and software bugs to be pinpointed from remote locations, according to the company.

Cache memory capacity is identical to the amount in the 750 and twice what is available in the 550-II.

A 4M-byte 9750 configured with two 315M-byte disk units, a streaming-tape module, CRT console and Primos operating system costs $251,500. A similarly configured 9650 system with a 2M-byte processor sells for $146,500.

Moreover, users of Prime's existing 750s and 550-IIs can reportedly upgrade their systems to become 9750s and 9650s for $98,000 and $52,000, respectively.

The prices, however, apply only to 750 and 550-II versions that comply with Federal Communications Commission cabinet standards, the firm said.

Deliveries of both the 9750 and 9650 will begin immediately from Prime at Prime Park, Natick, Mass. 01760.

NEWS SUMMARY

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Honeywell seeking to boost company image, exec says

De-emphasize hardware, commit to software R&D; shift from direct IBM competition

CW AT NCC

By Tom Henkel
CW Staff

LAS VEGAS — A revised focus that includes less emphasis on hardware research and development, a beefed-up commitment to better quality software and a move away from head-to-head competition with IBM are the key components that Honeywell, Inc. hopes will boost its somewhat tarnished reputation in the mainframe processor arena.

In an interview on the floor of the National Computer Conference here last week, the vice-chairman of the board and president of Honeywell's Information Systems Division, Dr. James Renier, said the division is trying to recover from a 27-year mistake.

Since its beginnings, Renier said, the Information Systems Division has been on the wrong track. It has functioned as a hardware vendor — not as a supplier of solutions to business problems.

Since its beginnings, Renier said, the Information Systems Division has been on the wrong track. It has functioned as a hardware vendor — not as a supplier of solutions to business problems.

Midway through his second year at the helm of the division, Renier said that while progress is slow, Honeywell is changing its approach to the mainframe marketplace. The key to success, he said, is to improve the users' image of Honeywell systems while developing products that solve specific business problems.

"I don't think it is any secret that in the past, we obviously did not have our act together," Renier said. But he was quick to add that the company's problems stem not from inferior products, but from the company's inefficiency in dealing with users.

The key to solving that problem, Renier said, is to improve the atmosphere within Honeywell. When he took control of the Information Systems Division, Renier said employee turnover was running at approximately 30%. Now, he said, turnover has been cut to roughly 8%.

But perhaps the biggest change at the Information Systems Division was the announcement in March of an agreement with Japan-based NEC Corp. to supply Honeywell with high-end mainframe processors.

Renier said Honeywell has been buying hardware from NEC for the past 20 years, but the recent agreement marks the first time the two firms have entered into a joint planning relationship to develop products.

The reason Honeywell entered the NEC arrangement, Renier said, is that it could no longer justify the high R&D costs associated with developing a mainframe computer system. He said Honeywell decided it would be more efficient to buy CPUs from other vendors and devote more time to developing specialized software.

"I don't care if it is Honeywell hardware or not. Frankly, I'd integrate an IBM [CPU] into a Honeywell system if it were the best," he declared.

Currently, Renier said Honeywell is testing its Gcos 8 operating system on the NEC mainframes and expects to make the combination available to users sometime in the third quarter of 1985.

In addition, Renier said Honeywell plans to develop more specialized software to appeal to specific industries. For example, Honeywell already offers specialized systems for process control and office building automation. Renier said Honeywell plans to carry the same strategy into other areas such as office automation systems designed for specialized markets.

U.S. seen ahead of Japan in computer technology, behind in development

LAS VEGAS — A preliminary report on the progress of fifth-generation computer development in Japan and the U.S. reveals the U.S. is ahead in basic research but falling behind in engineered products.

David Brandin, vice-president and director of information systems at SRI International, Inc. of Menlo Park, Calif., and the chairman of a U.S. Department of Commerce panel examining the U.S.-Japanese fifth-generation projects, unveiled the results at a session of the National Computer Conference here last week.

The panel is focusing on the efforts of the two countries to develop so-called expert, parallel-processed, natural language computers that emulate human reasoning. Final results will not be ready until September.

The panel examined three areas in terms of the Japanese position relative to the U.S. and looked at them from an overall position as well as a final assessment.

'It's a long race. Everybody is in a scientific run to see who will be the first to commercially exploit the fifth-generation work.'
— David Brandin, SRI International

In the area of basic research, the panel concluded that the Japanese are far behind, overall, compared with the U.S., and the assessment was that they are falling further behind.

This raises the question whether the Japanese can remain ahead if they do not do basic research, Brandin maintained.

In the second area surveyed by the panel — advanced product development — the results showed that Japanese efforts were equal, overall, to the U.S., and the assessment was that the Japanese were not gaining ground but holding.

In the third area surveyed — product engineering or products closest to final application — the overall results showed that the Japanese were ahead of the U.S., and the assessment was that they were "pulling away."

Brandin said the unofficial conclusions of the survey "reflect where the Japanese choose to place their emphasis."

However, Brandin said that fundamental research in fifth-generation technology is ultimately directed by marketplace forces.

Noting that the Japanese computer industry is more likely to work closely with end users in such areas as developing customized software code to run on the new processors, Brandin said, "this may give them strength in the long run.

"It's a long race. Everybody is in a scientific run to see who will be the first to commercially exploit the fifth-generation work," Brandin said.

Howling waves at NCC

CW photo by G. Angel

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Battelle relational DBMS targeted at VAX-11 users

By Paul Gillin
CW Staff

LAS VEGAS — Battelle Memorial Institute selected the National Computer Conference last week to announce its entry into the relational data base management systems (DBMS) market.

The company introduced DM, a DBMS that will initially run on Digital Equipment Corp.'s VAX-11 series computers. DM will be ported to Control Data Corp.'s Cyber 180 series and IBM mainframes in 1985.

DM is designed for handling multiple data bases and contains a feature for searching and manipulating textual elements, a spokesman said. It is powered by a reentrant, dictionary-driven kernel, which maintains records on how files are used and controls all requests from employees to get into files.

The multithreaded kernel allows up to 511 simultaneously executing programs to manipulate up to 250 data bases at once. Employees can use up to 10 data bases simultaneously, reviewing and switching information between files. Up to 2,000 separate data bases can be stored.

Data bases can be in a hierarchical, network or relational structure and are defined in three levels to ensure data independence. The physical model describes the organization of data in storage; the logical model defines the data's functional relations; and the user model depicts the logical user view. It uses a proprietary language that reportedly allows applications written in other languages to be quickly migrated to DM. DM can handle long textual elements as well as numeric data. It also handles variable-length records and fields, integer, floating-point, numeric-string and character-string data.

Documents can be searched in four basic ways. A word proximity search identifies all references in which words are located within a certain distance of each other. Boolean expressions can also be used. A wild card feature lets users search for complete words by providing a stem of a word. A numeric range can also be specified in search criteria.

Security is provided by a module that defines a data base and identifies all legal users of the system and which fields they can access. A data base administration module can be used to define prompts and Help screens to allow nontechnical users to develop applications.

Editing functions include scrolling within fields, multiview editing and global search and replace. A report writer is available that can produce standard or custom reports.

The product is written in a unified sublanguage with an English-like syntax. Statements may be embedded in host code by DM's Cobol or Fortran precompilers as well as in Slang, Battelle's system language.

An optional query language, called Fundamental Query and Manipulation (FQM), supports the data manipulation sublanguage. FQM is said to be based upon IBM's Structured Query Language.

DM will be available in the fall at a cost of $20,000 for the VAX-11. Each host language precompiler and interface costs $4,000. The query facility is priced at $8,000, and the report writer costs $5,000.

Battelle is located at 505 King Ave., Columbus, Ohio 43201.

Britton offers mirrored disk for its IDM 500

LAS VEGAS — Britton Lee, Inc. announced a mirrored disk option for its IDM 500 series of data base machines here at last week's National Computer Conference.

The hardware option reportedly provides protection against media failures by duplicating data bases on a redundant set of disk drives. The feature exploits the IDM's ability to maintain identical read/write data. With the option, the machine is reportedly able to function even if a disk drive fails during operation.

The option is transparent to the user. All existing software for the IDM can use the mirrored disk option without modification. Read and write operations to the mirrored disk are performed as if only a single drive were being accessed.

With the addition of the option, a maximum of eight removable or fixed disks can be duplicated, offering up to 5G bytes of storage. Disk drives can be mirrored in a variety of configurations.

During on-line operation, the IDM is free to read data from either drive of a mirrored pair in a transparent option. The IDM schedules a read to a particular mirrored drive, based upon the drive's activity level and position of the disk arm.

Existing IDM 500/1 and 500/2 users can upgrade to the mirrored disk option.

The option costs $9,000 to existing users. The price of the IDM ranges from $55,000 to $90,000.

Britton Lee is located at 14600 Winchester Blvd., Los Gatos, Calif. 95030.

NCC '84

A Panoramic View

CW PHOTOS BY G. ANGELL AND D. L. WAITE

Japan reveals development of fifth-generation machines

CW AT NCC

LAS VEGAS — In the third year of a 10-year project to develop a fifth-generation supercomputer capable of human-knowledge-based reasoning, the Japanese have produced a processor and a relational data base machine.

Dr. Kazuhiro Fuchi, who is the director of the Japanese fifth-generation project at the Institute for Generation of New Computer Technology (Icot), disclosed the development at the National Computer Conference held here last week.

The key to the new processor is the concept of logic programming, which is based on a new computer architecture and a new software framework.

The processor, called a sequential inference machine (SIM), is dependent on new very large-scale integration technology and is capable of performing parallel- or multiprocessing.

Fuchi called the machine part of the "first generation of a new age in the history of computing, not just an improvement or extension of the fourth generation of computers.

"The main point [of the fifth-generation project] is the adoption of logic programming," Fuchi said. This depends on new methodologies of software and the intelligent debugging of systems software natural language programming in sophisticated man-machine interfaces.

The production of the new processor is part of the completion of the first of a three-stage process over 10 years. The first stage has emphasized the perfection of a parallel architecture for the new processor and natural language software for logic programming.

Fuchi said the SIM processor, designed as a prototype of a personal computer, has operating system software that can be described as being close to a Digital Equipment Corp. Decsystem-10 Prolog, with 80M bytes of main memory that can process as fast as a Decsystem-20 Model 2060.

The SIM machine contains sophisticated I/O devices, such as an 8-bit map display and an interface to a local-area network. The operating system software, called Simpos, is still being perfected and will be completed by August, Fuchi said.

Fuchi also disclosed the completion of a relational data base machine, called Delta, designed as a "special engine for merging and sorting data," which can be hooked up to the SIM processor.

Fuchi said that the Icot project is focusing on basic research and development of the logic programming machine.

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this year's NCC announcements. NEC Information Systems, Inc. was the sole vendor to introduce a large system, with its Astra 300 model line of 32-bit superminicomputers designed as replacements for three models in its existing 16-bit Astra 200 family.

NCC continued to be a prime forum for storage product announcements, which included new product offerings from Tandon Corp., Kennedy Co. and Ampex Corp. Visitors also had the opportunity to see a number of new digital, laser and thermal printers and a prototype image-processing system demonstrated by Ricoh Corp.

NCC has not been regarded as an important arena for new software announcements, and attendees agreed that this year's show was no exception. Data base management systems (DBMS) and Unix-based products shared the software limelight here. Battelle Memorial Institute introduced its DM relational DBMS, and Cincom Systems, Inc., NCR Corp. and Pertec Computer Corp. all unwrapped new Unix software. Oracle Corp., Relational Technology, Inc. and United Software Systems and Services Corp. were among the many vendors that chose NCC to announce enhancements to existing DBMS products.

Within the realm of communications, the most significant event at NCC was the demonstration of two networks that implemented a standard, high-level communications protocol. Coordinated by the National Bureau of Standards, General Motors Corp., Boeing Computer Services Co. and 13 other organizations at NCC, the demonstration showed how information systems from diverse manufacturers can communicate using the International Standards Organization transport protocol. AT&T Information Systems, Inc.'s Information Systems Network was also demonstrated for the first time.

Microcomputer aficionados were awash in a flood of new software developed for Apple Computer, Inc.'s Macintosh. In all, more than 70 packages were demonstrated for the Macintosh, most scheduled for delivery within 90 days. Visitors got their first chance to see AT&T Information Systems' new AT&T Personal Computer and Compaq Computer Corp.'s Desk Pro series of micros. In addition, several new Motorola, Inc. 68000 microprocessor-based micros were introduced at NCC.

NEWS

Akers: Industry responsibility engenders society's trust

By Peter Bartelik
CW Staff

LAS VEGAS — Urging the computer industry to live up to its responsibilities to society, IBM President John F. Akers told the National Computer Conference last week, "We must explain ourselves to government, press and public."

CW photo by D. Hammond
Akers

Akers, the NCC keynoter this year, said the future of the information processing industry is limited only "to the extent that, by default, we encourage society and its institutions to impose shackles upon us."

He declared, "People won't use our products as fully as they might unless we merit their trust. And if we don't conduct ourselves responsibly, governments and other institutions will be encouraged to put up barriers and fences that could restrain growth and limit the usefulness of our industry."

The image of the industry, as projected through the media, "too often seems to be that of a battlefield, a place of cutthroat competition," Akers said. He blamed much of that image on the media's "lack of understanding of the competitive process in this industry" and said the conduct of industry participants contributed "to a limited extent."

The industry has three main responsibilities, Akers said: to its customers, to itself and to society.

Customers have a right to expect reliability in products, and the industry is "on the road" to realizing the concept of zero defects, Akers said. "Quality is important because it is sound and responsible business," he added.

Responsibility "to ourselves, as an industry" requires that the industry earn the respect of the public by not tolerating dishonesty and misappropriation of proprietary information, according to Akers. It also requires, he added, that the industry foster understanding by the press and public "that in this industry, this morning's competitor may be this afternoon's customer and this evening's partner in some joint venture, not gladiators in some mortal combat."

Societal responsibilities

To society at large, the industry has the responsibilities of aiding and sharing in the advancement of education and science, playing a constructive role in the debate over privacy issues and accepting "a direct challenge" to implement and use tools to safeguard data from computer crime.

Calling for the industry to lead the way in fostering a positive image, Akers said, "Society must know that ours is not the sort of industry that turns a blind eye to computer crime, fraud or unethical behavior of any kind, and it's incumbent upon all of us to see to it that the evidence bears that out.

"In our industry, therefore, we must concern ourselves not just with leading-edge technology, but with leading-edge ethics as well," he said.

NEC introduces 32-bit Astra 300 superminicomputer series

LAS VEGAS — NEC Information Systems, Inc. last week unveiled its first line of 32-bit, virtual memory superminicomputers, called the Astra 300 line.

The three-model line replaces most of the firm's older 16-bit Astra 200 series processor lineup. According to G. Millard Allen Jr., NEC's vice-president of systems marketing, NEC will continue to market the low-end Astra 220 model. But the three newly announced systems, dubbed the Models 330 VS, 350 VS and 370 VS, replace the Astra 230, 250 and 270.

The 300 series processors are said to be software-compatible with the older, 16-bit Astra 200 systems. Using a proprietary NEC very large-scale integration 10-Mhz, 32-bit CPU, the 300 series systems make use of the same NEC Itos operating system used on the 200 series processors.

According to Allen, all software developed on the 200 series processors will run, without modification, on the 300 series. He added that software developed for 300 series CPUs will not necessarily run on the older 200 series machines.

Calling it NEC's largest step to date toward offering an office-automation-oriented product, Allen said the Astra 300 line will be marketed primarily to large systems integrators and OEMs.

One of the primary markets for the system, Allen said, are telephony applications, wherein the systems can be used in conjunction with telephone private branch exchange switches and the firm's Necis telephony application software. The Necis software also offers users other capabilities, including electronic mail, word processing, relational data base management functions, general accounting, a calendar and telephone cost accounting.

Allen said the 300 series competes with low-end Digital Equipment Corp. VAX, Data General Corp. MV/4000 and Prime Computer, Inc. 2250 series processors.

The high-end 370 VS can accommodate up to 4M bytes of main memory, 32 workstations, 16 communications lines and three system printers. A printer can also be attached to each workstation, allowing a total of 35 printers to be attached to the system. This, the vendor claimed, is the highest printer capacity of any system in its class.

The mid-range 350 VS can support up to 16 workstations, 16 communications lines and 18 printers. The system is available with 1M byte of main memory and a maximum fixed Winchester disk capacity of 500M bytes. The unit can support a ¼-in. magnetic tape cartridge unit or a ½-in., reel-to-reel tape drive that is capable of storing information at 800 or 1,600 bit/in., the vendor said.

The low-end 330 VS supports up to eight workstations and eight communications lines.

A 370 VS with 2M bytes of main memory, 16 workstations and a 250M-byte Winchester disk drive costs $64,000. A 350 VS with 1M byte of main memory, eight workstations and a 250M-byte Winchester disk drive costs $42,000. A 330 VS with 1M byte of main memory, four workstations and a 125M-byte Winchester disk drive costs $27,200. An 800 or 1,600 bit/in., reel-to-reel tape drive costs $11,400, and a 15M-byte cartridge tape unit is available for $3,400.

The systems will be available in the fourth quarter of this year.

The 300 series was developed through a joint development arrangement between NEC Information Systems and its Tokyo-based parent company, NEC Corp. NEC Information Systems' headquarters is at 1414 Massachusetts Ave., Boxboro, Mass. 01719.

HP offers IBM link for its minis

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a communications link that enables its HP 3000 superminicomputer and its HP 1000 minicomputers to operate in IBM mainframe networks.

The HP Systems Network Architecture Network Remote Job Entry (HP SNA NRJE) and HP SNA Link reportedly allow the HP 3000 to emulate an IBM 8100 DPPX/RJE workstation, to function as a distributed processing node in an IBM SNA network and to act as a gateway between HP distributed systems and IBM SNA networks.

HP also introduced the HP Programmatic Mainframe Facility 1000 (PMF/1000), which is said to let HP 1000s emulate IBM 3270 cluster controllers.

HP SNA Link reportedly provides the hardware and software required to connect the HP 3000 to an SNA network as a physical unit, Type 2 PU-2 node. The HP SNA NRJE software is said to perform batch communications over the link.

The link was designed to support batch and interactive communications simultaneously at speeds up to 56K bit/sec.

According to the vendor, HP offers a no-cost analysis of the host configuration before installation.

HP said a typical application for HP SNA NRJE might include updating a central data base in an SNA environment with transactions processed on the HP 3000.

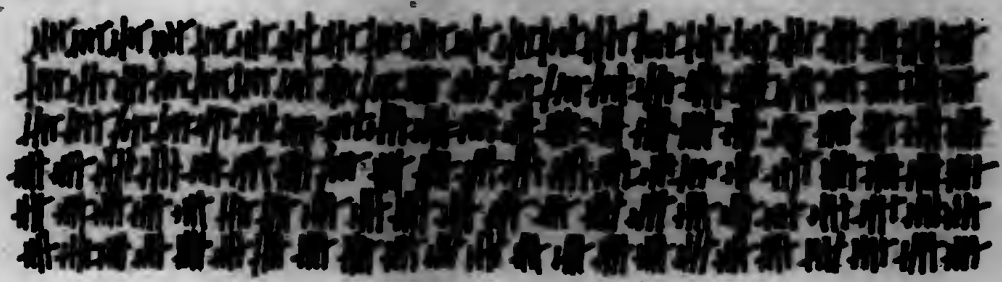
The HP PMF/1000 reportedly lets the HP 1000 be used as a distributed processing system with interactive links to IBM host applications and IBM IMS and CICS data bases to retrieve and store information. It is said to give HP 1000 users IBM 3278 display-station and 3284 print-station capabilities by using the HP 1000's 20 subroutine calls accessible from higher level languages.

According to HP, the PMF/1000 uses an intelligent microprocessor-based interface card that provides a typical response time of two seconds. It was designed to handle bisynchronous communications at 9,600 bit/sec over a nonswitched line.

HP SNA NRJE costs $4,500, and the HP SNA Link costs $7,500. Prices for the HP PMF/1000 range from $4,000 to $7,000, depending on the HP 1000 model being used. All three products are available now.

HP is located at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

This many 4300 users are sold on our dbms.



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Variety of printing technologies showcased at NCC

CW AT NCC

By John Desmond
CW Staff

LAS VEGAS — Digital, laser and thermal printing technologies were evident in a series of printer announcements at the National Computer Conference here last week.

Meanwhile, Ricoh Corp. unveiled a prototype of an image processing system intended to merge images and graphics. The system consists of the IS20 Image Scanner, the Ricoh SBC-16 advanced microcomputer and the Ricoh LP4120 desktop laser printer. The Image Scanner scans images from books or cards, digitizes the images and then displays them on the microcomputer where the image and text can be merged, according to the company.

The SBC-16, based on the Intel Corp. 80186 microprocessor and running on Microsoft Corp.'s MS-DOS operating system, has up to 896K bytes of random-access memory (RAM), two floppy disks and five expansion slots for options, the company said. The LP4120 laser printer is said to be capable of producing 12 page/min, weighs 112 lb and has RS-232C and RS-422 interfaces.

The IS20 is priced at about $2,000; the LP4120 is priced at approximately $10,000, the vendor said. The single floppy disk drive, monochrome screen SBC-16 microcomputer is priced around $3,000, and the dual floppy drive model is priced at $3,500, the vendor said.

Western Graphtec, Inc. announced the FP 5301 digital 10-pen plotter, which can be used for computer-aided engineering and business graphics applications. It replaces the WX 4630 series of slower one-, two- and 10-pen plotters, the company said.

Targeted to both the OEM market and end users, the FP 5301 is priced at approximately $3,000. More information is available from Western Graphtec, 12 Chrysler St., Irvine, Calif. 92714.

Quality Micro Systems, Inc. has announced the QMS Smartwriter laser printer, said to provide 90,000 dot/sq in. resolution. Based on the Motorola, Inc. 68000 microprocessor and including Qume Corp., Diablo Systems, Inc. and Epson America, Inc. simulations, the product is said to have 64K bytes of memory for programming features. A Centronics Data Computer Corp. parallel interface is standard, and an RS-232 interface is optional, the company said. The product prints at up to eight page/min and is priced at approximately $5,000. Quality Micro Systems is located at P.O. Box 81250, Mobile, Ala. 36680.

Canon USA, Inc. has announced the F-60 thermal transfer printer and the T-20 thermal printer. The F-60 is said to produce letter-quality printing using Canon's digital typing technology at a resolution of up to 360 dot/in. and up to speeds of 80 char./sec. The F-60 is priced at $549, the vendor said.

The T-20 is said to print at 28 to 56 char./sec and has three printing character types: 80 char./line, enlarged 40 char./line and condensed 136 char./line. The T-20 is priced at approximately $185, the vendor said. More information is available from Canon USA, Printer Division, One Canon Plaza, Lake Success, N.Y. 11042.

Bell & Howell Co. announced an IBM interface for its 66550 computer output microfilm (COM) printer, which is said to allow its use with any IBM mainframe network.

The price for a complete system, including a dry processing COM printer, a Digital Equipment Corp. PDP-11/24 minicomputer, 10M-byte hard disk, CRT console and the IBM interface, is $121,000, the vendor said.

More information is available from Bell & Howell, COM Division, 16601 Hale Ave., Irvine, Calif. 92714.

NEWS

NCC sees host of peripherals but few systems debuts

CW AT NCC

By Tom Henkel
CW Staff

LAS VEGAS — A flurry of peripherals but few systems announcements topped the hardware products unveiled at the National Computer Conference here last week.

NCC '84 will not go down in history as a momentous occasion for systems announcements. As has been the trend with recent NCCs, few big systems were unveiled at the show.

NEC Information Systems, Inc. was the only vendor to unveil a large system with the Astra 300, a three-model line of 32-bit superminicomputers, priced from $27,000 to $64,000, and which the vendor said replaces much of the firm's older Astra 200 line.

While not a new product per se, Elbit Computers, Ltd., based in Haifa, Israel, chose NCC '84 to announce it plans to compete in the already overcrowded IBM 4300-compatible marketplace with its line of plug-compatible mainframe systems.

Several specialized hardware products were also announced. For example, the Computer Products Division of Computer Automation, Inc. introduced a rack-mountable version of its Datacase/5 microcomputer for industrial applications. The system was designed to use the Unix operating system or Computer Automation's Cartos operating system. Datacase/5 comes with 512K bytes of random-access memory (RAM) with error correction, a 26M-byte Winchester disk drive, a 1M-byte floppy disk drive and eight I/O ports for $12,900. The vendor is located at 4890 Sterling Drive, Boulder, Colo. 80301.

Motorola, Inc. unveiled a 32-bit software development system, called the Benchmark 20, for first-time users of the Motorola 68020 microprocessor. The Benchmark 20 features a 68020-based microprocessor, 1M byte of RAM and a four-slot chassis and power supply. The Benchmark 20 system costs $14,995, the vendor said. Motorola can be reached through P.O. Box 20912, Phoenix, Ariz. 85036.

Lee Data Corp. announced an entry-level version of its Series 400 line of IBM 3270 controllers, which can support devices geared to operate on Digital Equipment Corp. or Hewlett Packard Co. processors. Called the Model 408, the controller supports up to 16 display stations and uses either Binary Synchronous Communications or Systems Network Architecture/Synchronous Data Link Control communications protocols at speeds from 1,200 to 9,600 bit/sec. The unit costs $8,075. The vendor is located at 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

Memorex, Qume lead terminal entries at NCC

By John Desmond
CW Staff

LAS VEGAS — Memorex Corp. and Qume Corp. took the lead in terminal products announcements at the National Computer Conference here last week.

Memorex Corp. announced the 2178 display station in the company's line of plug-compatible products for the IBM 3270 terminal systems. Featuring a 12-in. green phosphor screen and weighing 25 lbs, the 2178 is said to connect to Memorex 2076 or 2074 cluster controllers or the IBM 3276 or 3274 cluster controllers for communication with IBM or IBM-compatible hosts.

The 2176 is priced at $1,485. Further information can be obtained from Memorex, San Tomas at Central Expwy., Santa Clara, Calif. 95052.

Qume announced an alphanumeric terminal for data entry and retrieval, an eight-color graphics terminal and a medium-resolution, bit-mapped graphics terminal.

The QVT-109 terminal has a 14-in. screen, 38 user-programmable functions, an optional RS-422 interface and RS-423 compatibility on the main port. The QVT-109 is priced at $795 in single units, the vendor said.

The QVT-511GX eight-color graphics terminal is compatible with Tektronix, Inc.'s 4105 graphics terminal and is said to meet the Ansi X3.64 standard. Display resolution is 480 by 360 pixels, the company said. The QVT-511GX is priced at $2,895, the vendor said.

The QVT-311GX emulates the graphics modes of the Tektronix 4010/4104 and Digital Equipment Corp. VT125 terminals, the company said. The alphanumeric modes are said to be compatible with DEC's VT52, and the terminal conforms to Ansi X3.84 standards, the company said.

The QVT-311GX is priced at $1,995 in single-unit quantities, the vendor said. Deliveries on all three Qume terminals will begin in October, the company said. More information can be obtained from Qume, 2350 Qume Drive, San Jose, Calif. 95131.

NCC a hot forum for storage products — as usual

By Tom Henkel
CW Staff

LAS VEGAS — The National Computer Conference has always been a hot forum for storage product announcements, and this year's show, held last week, was no exception.

For example, Tandon Corp. unveiled a family of 5¼-in., half-height floppy disk drives, the TM65 series, which can accommodate up to 1M byte of storage. The family consists of two models, both aimed at OEMs producing a variety of systems, including word processors, desktop systems and portable micros.

The Model TM65-4 features a 96 track/in., double-sided drive that offers a 1M-byte storage capacity. It features microprocessor-controlled spindle capacity and head positioning, a 3 msec track-to-track access time and costs about $150. The Model TM65-2L employs large-scale integration in its circuitry and features a recording density of 48 track/in. The unit is a double-sided drive that offers 512K bytes of storage and a track-to-track access time of 6 msec, the vendor said.

The unit costs roughly $125, according to Tandon. The vendor is located at 20320 Prairie St., Chatsworth, Calif. 91311.

Kennedy Co., an Allegheny International, Inc. company, announced an 8-in. Winchester disk drive that employs composite heads and a rotary actuator. The unit offers an unformatted capacity of 166.9M bytes with an average access time of 20 msec. Called the Model 73160, the unit costs $4,695.

Kennedy also unveiled a 5¼-in., streaming-cartridge tape unit, which is said to include up to 16K bytes of buffer storage. Called the Series 6500, the unit is said to be capable of ramping up and down from its 90 in./sec operating speed in 150 msec. The drive was designed for Winchester disk drive backup and is capable of backing up a 60M-byte drive in 12 minutes.

The unit is available in two versions, a full-height version with a formatter card for $1,275 and a half-height version without the formatter which costs $875. Kennedy is located at 1600 Shamrock Ave., Monrovia, Calif. 91016.

Ampex Corp. announced a family of 14-in. Winchester disk drives that offer up to 825M bytes of storage.

Called the Ampex 825, 660 and 330, the rack-mountable drives offer 330M, 660M or 826M bytes of unformatted storage. All three models offer an average seek time of 21 msec and use a linear voice-coil actuator in a closed-loop dedicated servo system, the vendor said. The units support a 1.859M byte/sec data transfer rate. The Model 825 costs $8,250, the Model 660 costs $7,500 and the Model 330 costs $6,000. Ampex is located at 401 Broadway, Redwood City, Calif. 94063.

No easy way seen to integrate DP, communications

CW AT NCC

By John Dix
CW Staff

LAS VEGAS — As the importance of communications within organizations increases, it becomes harder to operate the data processing and telecommunications departments autonomously.

There does not, however, seem to be a standard way to consolidate the tasks of these two departments.

That was the consensus reached thrpugh a series of interviews conducted on the floor of the National Computer Conference here last week.

Half of the users queried indicated that their telecommunications department reported to data processing, while the others said that the two departments operated autonomously.

At Hoover Universal, Inc., a diversified manufacturing company based in Ann Arbor, Mich., the telecommunications department used to report to purchasing, according to Garwood Erickson, corporate director of MIS. It has since been realigned under the MIS department, which now makes all purchasing decisions for both computer and communications equipment and services.

This enables the centralized MIS department to set procurement standards and coordinate volume purchasing, Erickson said. Centralization of these functions has not hampered the company's efforts to decentralize other MIS functions.

Hoover is made up of nine divisions and 50 manufacturing plants. Over a year ago it initiated a three-year plan to establish MIS groups within each division. These groups are primarily concerned with the development of applications that are particular to their division.

Corporate MIS retains control of technical operations. This includes the specification of a corporate network architecture — in this case, IBM's System Network Architecture — and the types of communications equipment used, such as local nets and modems.

The MIS departments in the various divisions are responsible for implementing the various systems available to them as they see fit, Erickson said.

Similarly, Harke-Hanks Communications, Inc., a diversified company that, among other things, operates CATV systems and publishes newspapers, has a centralized procurement division for both computer and communications hardware.

Homer J. Faucheaux, corporate director of systems procurement at Harke-Hanks, said that in his organization the telecommunications department reports to the director of information systems, who reports to the vice-president of information services.

Information services has a subdivision that manages the company's integrated voice/data network, Faucheaux said. But the procurement of equipment, including private branch exchanges and local nets, is still performed by a single, centralized group.

Unlike these two companies, DP departments in the U.S. Air Force report to the Air Force Communications Command (AFCC). While the peculiarities of the armed forces necessitate reporting structures different from those in the corporate world, the impetus behind adopting the structure is interesting.

Control consolidated

Lieutenant Robert A. Markham, a technology research analyst with the Strategic Air Command (SAC) at the Offutt Air Force base in Nebraska, said that earlier this month the Air Force established the Information Systems Organization. The formation of this group consolidated the control of the DP departments of each command within the Air Force, including SAC, the Military Airlift Command and the Tactical Air Command, Markham said.

The AFCC now oversees what Markham calls the administrative duties of each command, while the comunands retain control of systems operation and determine what functions are supported.

While the benefits of the change will not actually be known for a while, Markham anticipates that the real payoff of consolidation will be in the streamlining of communications and data processing support. In particular, the new structure will facilitate planning and the creation of future requirement definitions.

Users within the various commands will now be able to "go to one place to get requirements satisfied," Markham said.

Interestingly, before this structure was put in place, a joint task force, comprised of members from the telecommunications side of the AFCC and from the data processing departments within the commands, was formed to study local networks.

The formation of the Information Systems Organization is expected to expedite the work being done in this group by "removing the bickering between the two groups," Markham said. Now "they don't have to worry about stealing turf from one another," Markham added.

NCC exhibitors report attendance down, business up

LAS VEGAS — Although National Computer Conference sponsors will not release any statistics, exhibitors interviewed at the show last week agreed that attendance at their booths is down from last year's show in Anaheim, Calif.

Those exhibitors also said, however, that visitors who came got down to some serious business.

"My impression is that the traffic volume is not large, but the type of people who are stopping by is the kind we'd like to see," said David H. Thomsen, systems product manager with Plexus Computers, Inc. of Santa Clara, Calif.

Forman

Whalen

Moran

Desert site

Thomsen said his firm estimated before the show began that attendance would be down 20,000 to 40,000 people from the 1983 show, due mainly to the siting of the show in the desert in the middle of the summer.

Kenneth Niovitch, manager of sales and marketing with Nova Electric Manufacturing Co. of Nutley, N.J., agreed tht attendance has been slower than at past NCCs.

"But generally, the quality of the people has been good. People seem to know what they're looking for," he added.

Exhibitors offered various explanations for the lighter attendance, but the general consensus was that the show's location had a lot to do with it.

Laura M. Whalen, media and exhibits manager with SAS Institute, Inc. of Cary, N.C., said she was "extremely disappointed" with the traffic volume. She and others said they believe that Las Vegas is too far away from major population centers, which means fewer local visitors.

But a lack of local attendees is not necessarily bad, commented Catherine Raftery, director of marketing for Lear Siegler, Inc.'s Data Products Division in Anaheim, Calif.

She said her company's past studies of conference attendance in major cities showed that about 75% of the people come from surrounding areas. "I think what's been sorted out are the shoppers," Raftery maintained.

"The people who are coming in are interested in buying terminals — and buying large numbers of terminals," Raftery said.

Niovitch

Thomsen

Notable difference

"It's notably different from NCC last year," said Louis J. Finnegan, vice-president of sales for Aviv Corp. of Woburn, Mass.

At last year's conference, he said, about 50% of all inquiries Aviv's booth received were for products and markets the company does not serve. "This year we're getting a large percentage of people who do have a need for our products," Finnegan explained.

Showgoers apparently have been willing to brave a short jaunt through the heat to get from the main convention center to the satellite site at the Las Vegas Hilton Hotel.

More visitors

Several exhibitors there said they are satisfied with the number of people who have visited their booths.

Raftery

Hong

CW photos by G. Angel

Finnegan

"I think the traffic's been wonderful," said Edward A. Forman, product marketing manager with Relational Technology, Inc. in Berkeley, Calif. He added that although attendance seems lower than last year, the environment is less crowded and noisy, and customer inquiries are "more sophisticated."

Plexus' Thomsen was pleased with the large number of foreign visitors who came to the show from all corners of the world. "We've seen a lot of international visitors, and that's an emerging market for us," he said.

Myung-Soo Hong, a general manager of Korea-based Samsung Electronics's Los Angeles branch, said there has been "a little less people, but more business."

Exposure to U.S.

Denis Moran, president of Softway, Inc., a French maker of microcomputer software, was among the international visitors at the show. He said show attendance is not as important to his company as the exposure and experience in the U.S. market that NCC provides.

The French government sponsored the booths for a half dozen or so French vendors, according to Moran.

AT&T desktop, Macintosh tools head micro offerings

CW AT NCC

By Eric Bender
CW Staff

LAS VEGAS — Although many major micro vendors skipped the National Computer Conference here last week, a grab bag of microcomputer products debuted. NCC '84 also became the first trade show to exhibit the recently introduced desktop personal computers from AT&T Information Systems and Compaq Computer Corp.

Apple Computer, Inc.'s booth, featuring dozens of new software applications for the Macintosh personal computer, drew the heaviest crowds of the show. One Macintosh package which drew great interest was Filevision, a "visual filing" program that integrates data base and imaging features. The $195 program will be available in mid-August from Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, Calif. 90405.

Macvision, a hardware/software combination that permits the Macintosh to accept video input and manipulate the resulting images, was another hot product. Priced at $300, Macvision will be offered in October by Koala Technologies Corp., 3100 Patrick Henry Drive, Santa Clara, Calif. 95050.

Several hardware peripherals for the Macintosh were also introduced at NCC, including 5¼-in. Winchester disk drives from Corvus Systems, Inc. A 5M-byte Omnidrive is priced at $1,795, an 11M-byte drive is priced at $2,495, a 16M-byte version will sell at $3,195, and a 45M-byte system will cost $4,995.

The drives begin shipment next month, according to Corvus, which is headquartered at 2100 Corvus Drive, San Jose, Calif. 95124.

Among personal computer announcements, Panasonic Industrial Co. showed a hard disk drive version of its Senior Partner. The IBM-compatible Super Senior Partner, with 10M-byte hard disk drive, floppy disk drive, built-in thermal printer, 128K bytes of random-access memory (RAM) and 9-in. CRT, reportedly will be priced under $5,000 when it becomes available in September. Panasonic is located at One Panasonic Way, Secaucus, N.J. 07094.

Several multiuser microcomputer products were launched, including an Intel Corp. 80286-based system from Visual Technology, Inc. The Visual 2000 reportedly supports up to 16 users, running under the Microsoft Corp. Xenix operating system. A starting configuration with 512K bytes of RAM, 19M-byte hard disk drive and floppy drive will cost $8,990. Shipments are planned for fall, according to Visual, which can be reached at 540 Main St., Tewksbury, Mass. 01876.

In the local-area network arena, Nestar Systems, Inc. introduced Plan-pak, a set of five application software packages designed to run on the company's Plan networks. For a 60-day period, Nestar is bundling the software free with all Plan 3000 and 4000 file servers. Nestar is located at 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

User views vary on micro link

LAS VEGAS — Solutions to linking the microcomputer, like beauty, lie in the eye of the beholder.

Dr. Joe Holland of Texas A&M University and Charles Wilson, controller at Nellcor, Inc., chose opposing methods to link their company's microcomputers. They outlined the reasons for their choices at a work session at last week's National Computer Conference here.

A multiuser microcomputer system from Compupro Corp. met Texas A&M's computing needs. One reason Holland chose the system was the need for quick information retrieval. "We needed a system that had at least a 20M-byte hard disk," Holland said.

Another factor was the number of experienced users on site, he added. "We had a number of people who were familiar with [Digital Research, Inc.] CP/M software," Holland said. "We didn't want to negate their training."

Systems cost was the critical purchase consideration for Holland. He estimated that a 77-terminal network system would cost $640,000, a mixed network and multiuser system would sell for $513,000 and a multiuser system was priced at $440,000. "To add a workstation to the multiuser system costs $1,000," Holland estimated. "If we were using a network, each addition would cost approximately $4,000."

Nellcor replaced its Compupro system with a 3Com Corp. local-area network. "We are growing very rapidly and need a system that can be easily expanded," Wilson said.

Nellcor's system has been expanded from 14 IBM Personal Computers and one file server system seven months ago to a 36-microcomputer, three file server system today.

Challenging workplace seen prime recruitment lure

LAS VEGAS — What is your company doing to attract qualified personnel to your data processing department? For many company representatives surveyed at the National Computer Conference last week, the answer to this question was a simple one: Provide a challenging workplace for computer professionals.


Moffatt

Although traditional concerns such as salary and benefits were also considered important factors in recruitment, the respondents emphasized their firm's ability to offer a chance to work on the "leading edge" of technology.

"We try to stay up with the latest technology in hardware and software," said Dan T. Divine, manager of the data center for McKesson Corp., a company that distributes pharmaceuticals, spirits and chemicals. "That's how we attract new personnel."

Lynne Nicholson, data base manager for BDM Corp., an international professional services company based in Albuquerque, N.M., said BDM stresses the "fluidity" of its organization. The company offers data processing professionals the chance to work on a wide variety of projects, as well as gain experience with a number of mainframe computer systems, Nicholson said.

In addition, the firm tries to provide a dynamic workplace, she said. "Systems people tend to get bored if they're not challenged or motivated," she explained.

John L. Hutson, president of Signal Corp., a power products company based in Elk Grove, Ill., said his company touts the advantages of working with a small company when recruiting new employees.


CW photos by G. Angel
Brown

"A company our size offers individuals the chance to get their hands around an information system," he said. "We're not so large that someone gets lost in the organization," he added.

Chet B. Brown, project manager of the research and development division of Candle Corp., a Los Angeles-based software development house, said his company emphasizes its stature in the field when recruiting data processing professionals.

Brown said the company seeks out qualified individuals by looking for people who are "interested in getting involved" in Candle's product development efforts or research and development work. Like other high-technology companies, Candle stresses a work environment that offers the chance to work on "the forefront of technology," Brown said.

John H. Moffatt, president of Betadata Systems, Inc., a software development firm based in Tucson, Ariz., said his company takes a different route than most when trying to attract qualified personnel.

Betadata, which hires employees on a contract basis, emphasizes flexibility when talking with potential employees, Moffatt said. By working on contract, a worker can set his hours to suit his individual work style, he explained. Since Betadata does not pay fringe benefits, the company can offer higher wages, another selling point for the company, Moffatt said.

Although traditional concerns were also considered important factors in recruitment, the respondents emphasized their firm's ability to offer a chance to work on the "leading edge" of technology.

Harmon Hardy, president of Zytec Computer Corp., a microcomputer firm based in Dallas, said his firm uses a variety of means to attract qualified hardware and software designers.

In addition to financial incentives, Zytec stresses the advantages of working in a small organization, Hardy said.

"We give them the chance to advance their skills in a small company where they have a lot more responsibility and a lot more control over the complete project," he explained.

Some NCC attendees still reeling from AT&T breakup

LAS VEGAS — Northern Michigan University in Marquette is in the process of becoming a little telephone company ready to install its own centralized voice/data private branch exchange (PBX) system to serve the campus needs of its students.

The U.S. Postal Service wants to link over 400 DP sites and needs engineering help at the local telephone company level.

The American Holstein Association in Brattleboro, Vt., has a centralized DP shop where it is continually upgrading, via telephone, the records of several million milking cows.

Breakup blues

These three users, interviewed last week at the National Computer Conference here, said they are still reeling from the AT&T breakup last January, when the seven divested Bell operating companies, comprising 26 local telephone companies, were split off from AT&T's equipment, long distance and research operations.

The impact of the divestiture on DP shops was dramatic. Al Drowne, director of administration for the Holstein Association, called it a "very traumatic thing. It's really too soon to tell what the end result will be.

"The industry is in a state of chaos. Customers are really confused, and it is frustrating. But at the same time AT&T Communications appears to be doing better than the local telephone companies. The [divested Bell operating companies] aren't offering the products that we need," Drowne added.

Joseph Weatherspoon, project manager for the Postal Service in Washington, D.C., was attending NCC '84 to see what technology was being offered to handle data communications in a metropolitan area. The Postal Service is in the process of designing a computer system that will link 400 DP sites in 50 states.

"In the past, the telephone company had one management system; now there are seven [telephone companies] in 50 states, each with their own system. It has caused problems. There is the time irritation and human irritation factor," Weatherspoon said.

'Little telephone company'

Whitney L. Johnson, director of MIS at Northern Michigan University, said that the breakup essentially pushed the university to become a little telephone company, and it is planning to purchase a voice/data PBX system because the local telephone company could not provide a combined service.

The university was using 30 low-speed asynchronous lines and 10 dedicated lines to link 56 remote job entry 3270 workstations to its Digital Equipment Corp. PDP 11/34 and IBM host. Johnson indicated that the university was leaning toward a Northern Telecom, Inc. PBX after evaluating several other products.

In the view of Brian Tkaczyk, a telecommunications planner for the Holstein Association, the divestiture has prompted a convergence of job functions by DP managers and telecommunications managers. In the past, the two were inclined to protect their respective turfs.

The divestiture caused confusion, and the telephone company was forced to explain to customers what was happening. "They should have gotten on with the job of delivering service," Tkaczyk said.

Bottlenecks, delays

Major bottlenecks have been created by delays in getting data communications lines up and running for the Holstein Association. Installation delays vary from the 15 days promised by the local telephone company in Vermont to the 90 days promised by AT&T Communications.

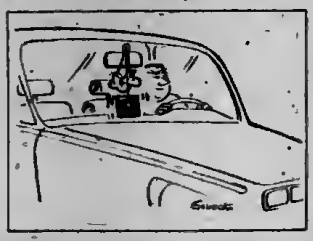
"AT&T says it is a paper problem, and I think they will be able to fix it. So the future may not be as bad as everyone predicts," Drowne said.

Hans Von Muldau, a consultant from the West German firm of Pflat in Rossdart, who was attending his seventh NCC, said that the American telecommunications system was resilient enough to withstand the AT&T divestiture.

"In Germany, we have a government-run system, and they are five years behind in technology. You have to get your modem from the Bundespost instead of buying it from an equipment vendor like you can in this country," he said.

Von Muldau said comparing telecommunications costs between Europe and the U.S. shows that pricing is becoming equivalent. Units of service are being priced separately instead of in packages with resulting cost increases.

Weatherspoon said of the impact of the divestiture: "I am becoming a billing expert most of all."



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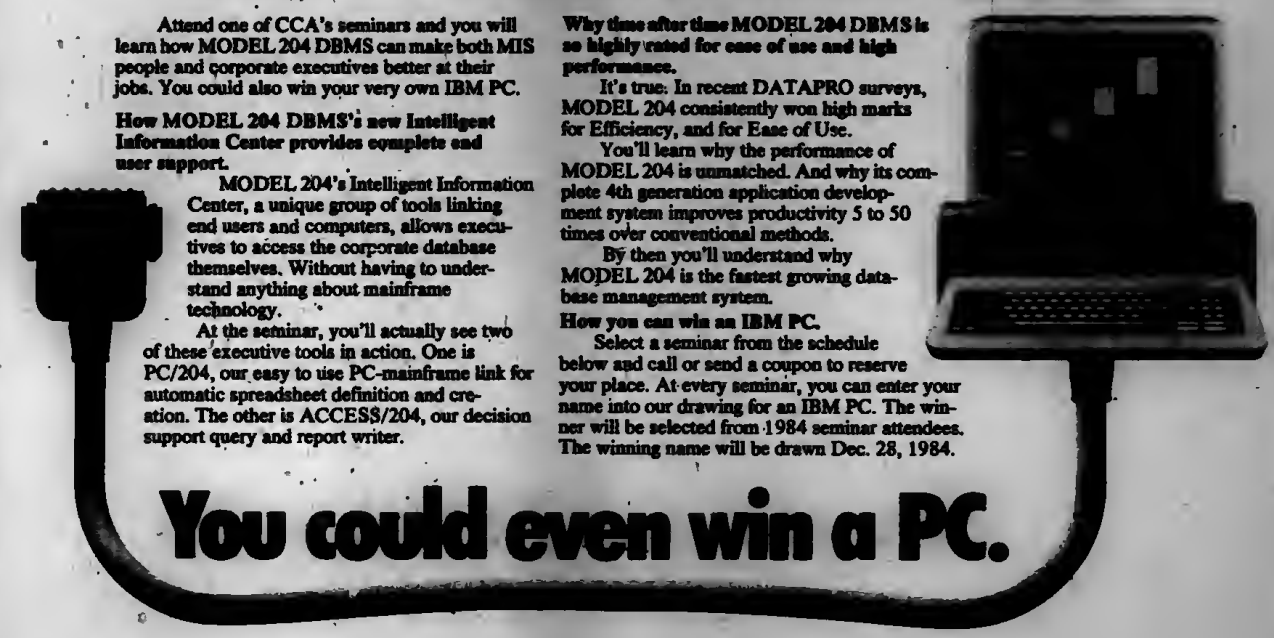

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CCA's Executive DBMS Seminar Schedule

July		September			
Dallas	July 10	Albany	Sept. 20	New Orleans	Sept. 27
Oakland	July 12	Baltimore	Sept. 25	New York City	Sept. 18
Portland, OR	July 26	Birmingham	Sept. 25	Rochester	Sept. 13
San Francisco	July 25	Boston	Sept. 11	Sacramento	Sept. 27
St. Louis	July 12	Chicago	Sept. 5	Saddlebrook, NJ	Sept. 12
August		Cincinnati	Sept. 13	San Antonio	Sept. 12
Houston	Aug. 21	Denver	Sept. 13	San Diego	Sept. 20
Los Angeles	Aug. 30	Hartford	Sept. 27	San Francisco	Sept. 13
Minneapolis	Aug. 28	Indianapolis	Sept. 27	Tulsa	Sept. 11
San Mateo	Aug. 28			Washington, D.C.	Sept. 20

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NEWS

NCR unveils Officeware for Tower 1632 supermicro

By John Desmond
CW Staff

NCR Corp. used the opening day of the National Computer Conference last week to announce a software package for its Tower 1632 supermicrocomputer, which allows up to 14 IBM Personal Computers and compatibles to be used as intelligent workstations. The product also offers a windowing feature for the first time on a Tower product.

Officeware, developed by Century Analysis, Inc. and licensed to NCR, is aimed at two markets: the installed base of Unix-based Tower 1632s and Fortune-type companies using IBM Personal Computers and compatibles as stand-alones, the company said.

Officeware includes seven modules: Script for word processing; Plan for spreadsheets; Forms for data management; Graph for bar, line and scatter graphs; Terminal for linking with a host processor; Desk for an array of individual applications, such as appointments and telephone numbers; and Network for interoffice information applications, including electronic mail, scheduling and network filing, the company said.

The windowing feature is said to allow multiple documents, graphs and spreadsheets to be shown as windows that can be moved, changed, filed or incorporated into the word processing module.

Officeware also features the capability to use multifunction workstations as stand-alone units for personal computing. The workstations can run much of the popular software on the market, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II, the company said.

Besides the IBM Personal Computer, NCR Officeware can be used with the NCR Personal Computer Model 4 and any IBM PC-DOS-based microcomputer, according to the company.

Its price tag

The price for an eight-user system with a typical configuration, including a Tower 1632 with 1M byte of memory, a 1M-byte flexible diskette, 46M-byte hard disk storage, Unix operating system, two printers, a console CRT display, NCR Officeware software and aight workstations, is $58,870.

For current Tower users, the price for NCR Officeware is $1,500 per workstation. The software must be purchased for a specific number of workstations, and if a user wants to add more workstations, slightly altered software must be provided by NCR, according to Earl A. West, manager of third-party products in NCR's Product Marketing Division.

The product is available immediately from NCR, which is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Alpha Microsystems introduces its Alphanet local-area network

LAS VEGAS — Alpha Microsystems, Inc. last week introduced a broadband, token-passing local-area network, based on the use of coaxial cable carrying a radio frequency (RF) signal, that the company said is much less costly than Xerox Corp.'s Ethernet system.

Called Alphanet, the local-area network was designed to network only Alpha Microsystems' products, including its supermicrocomputers, printers and both the new Model 506 and 510 workstations.

Those workstations, introduced June 25, come bundled with Alphamate software, introduced along with them, which reportedly allows the workstations to function as terminals in a multiuser environment with one of the firm's supermicrocomputers as a host.

The 510 and 506 workstations operate under both Alpha Microsystems' proprietary Amos operating system and Microsoft Corp.'s MS-DOS, the latter giving them access to the library of software being written for the IBM Personal Computer.

They will also operate under the company's implementation of Unix, called Unimos, introduced with the workstations, but are currently available only on the firm's 1172 supermicrocomputer. Unimos will reportedly be available on the firm's entire line in two months.

Unix response

The introduction of a Unix-based operating system does not indicate a move away from Amos, but a response to the fact that there is "a good deal of Unix mind set in the marketplace," said Bob Coupland, the firm's manager of corporate communications.

The Alphanet local-area network will support 64 workstations and will be available in September or October at a cost of roughly $100 to $200 per node. The Alphanet was on display here last week at Alpha Microsystems' National Computer Conference booth.

The 506 workstation, with a monochrome monitor, dual-diskette drives, 128K bytes of random-access memory (RAM), MS-DOS, Alphamate and other features, is priced at $2,600, $3,115 with a color monitor.

The 510, with a 10M-byte hard disk storage unit and one diskette drive, 128K bytes of RAM and the same software, is priced at $4,400; $4,785 with a color monitor.

Alpha Microsystems markets to value-added resellers who, in turn, market the products to specific vertical markets, including medical, legal, educational and insurance institutions, among others.

Fujitsu targets MIS manager with enhanced line of micros

Targeting the MIS manager, Fujitsu Microelectronics, Inc. has added 10M- and 20M-byte hard disk micros and IBM mainframe communications capability to its line of personal computers.

Fujitsu's Micro 16SX features an Intel Corp. 8086 microprocessor, 384K bytes of random-access memory (expandable to 1M byte) and a 360K-byte floppy disk drive, according to the company.

The 8086 reportedly operates at a speed of 8 Mhz, which is approximately twice that of microcomputers based on Intel 8088s. Users can choose one of three operating systems: Microsoft Corp.'s MS-DOS or Digital Research, Inc.'s CP/M 86 or Concurrent CP/M.

Fujitsu said that 250 software packages, including Sorcim Corp.'s Supercalc III, Ashton-Tate's Dbase II and Condor Computer Corp.'s Condor III, run on the Micro 16SX.

The Micro 16SX is approximately 80% IBM Personal Computer-compatible, according to Tony Perez, Fujitsu's manager of organization and administration. "As long as the program does not use IBM's Bios, it will run on our system," he said.

Fujitsu also announced three communications packages: SNA-3270, BIS-3270 and Acculink. SNA-3270, priced at $650, converts mainframe Ebcdic data to microcomputer Ascii format, Fujitsu said.

BIS-3270, selling for $595, emulates an IBM 3270-series terminal. Acculink, an asynchronous communications package that sells for $295, reportedly allows the Micro 16SX to emulate Ascii terminals.

The micro features five expansion slots and interfaces to a serial port, a parallel port, a color monitor, a black-and-white monitor and a light pen. A 10M-byte Micro 16SX sells for £4,250, while a 20M-byte system costs $4,950.

Fujitsu Microelectronics is located at 3320 Scott Blvd., Santa Clara, Calif. 95051.

Foreign attendees: Why they journeyed to NCC '84

CW AT NCC

By Susan Blakeney
CW Staff

LAS VEGAS — What sacred rite is this that compelled people to flee their native lands and swarm to the desert city of Las Vegas last week to partake in this strange sacrament called the National Computer Conference?

"My boss made me come" was the reason given by Jose Inwredt, applications manager of Control Data of Mexico in Mexico City. Inwredt's compatriot, Federico Franssen, made the northern trek because "I'm in charge of buying computers and computer products for my company, and I wanted to see what's new." Franssen, who is a chief engineer with Petroleos Mexicanos in Mexico City, added that he had already seen "some things that I might buy" at the show.

Guss Grinde, software manager at Myab Corp. in Sundbyberg, Sweden, came to NCC '84 looking for Unix software packages for his microcomputer manufacturing company. His first stop on the show floor? AT&T's booth.

Grinde admitted that he thought IBM held the leading position in computer technology, but said he did not like the IBM Personal Computer. "I think it represents a step backwards. That's why I'm interested in Unix," he said.

This was the first visit to NCC for Stig-Arne Rapp, information systems manager at Oljekonsumenternas Forbund in Stockholm. Rapp made the journey because "coming here is a little bit like looking into the future." He said he did not come to look at anything in particular, but found the show floor "full of interesting things."

When asked what company he thought was most interesting, Rapp responded without a moment's hesitation: "IBM."

'More than big'

Tsugio Chiba of the image and graphics group at Sumisho Electronic Systems, Inc. in Tokyo said that Datashow in Japan was considered a big show, but by comparison, NCC "is more than big."

His company sent him to the conference to scout out graphics products, but "I've circled this show for about three hours, and I can't find anything."

"Last year the theme of the show was graphics. This year it's windows," summarized Asher Tsafrir, director of operations research and decision support systems at Megar Corp., a sprawling Israel-based agricultural cooperative.

Tsafrir made the 8,000-mile trip to hunt down equipment to automate his company's extensive network of farms. The systems will be distributed throughout the country, "from the cowshed to the cotton office."

When asked if he had found anything he wanted to take home with him, Tsafrir said, "I'm interested in some of the [personal computers] — we'd like to replace our 1,000 terminals with [personal computers] — but of course, I can't pick the hardware because we haven't decided on software yet."

Of the six international guests interviewed, only the two Mexican attendees said they suffered from harsh domestic import/export restrictions that prevented them from acquiring the technology they desired.

"We have some problems in that area," Franssen explained. "The [Mexican] government is trying to reserve the microcomputer and minicomputer market in Mexico for Mexican-based vendors. This way, they get lots of U.S. companies to set up shop there. We need the money to pay off our national debt."

AMA seminars to focus on OA

WASHINGTON, D.C. — The American Management Association (AMA) will sponsor a seminar on "Automating the Office: A Tactical Guide for Success," Aug. 13-16 at the AMA Management Center here and Sept. 10-12 at AMA headquarters in New York.

The seminars are being held for MIS and data processing executives, as well as executives in administrative systems, information management and communications, who have begun OA efforts.

Among the instructors will be Ellen Sokol, cofounder of Organizational Resources Group, Inc., a counseling firm specializing in information systems; John Bulyk, also a cofounder of Organizational Resources and a former portfolio manager; and David Potter, a manager of Tymshare Office Information Systems.

The registration fee for each seminar is $695 for AMA members and $800 for nonmembers.

Further information is available through the AMA, P.O. Box 319, Saranac Lake, N.Y. 12983.

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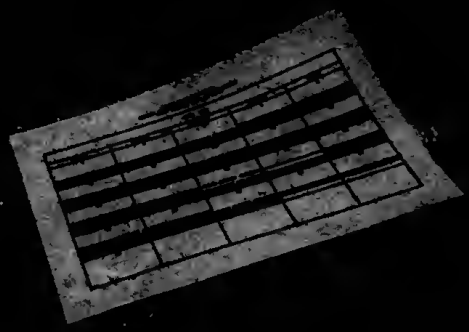

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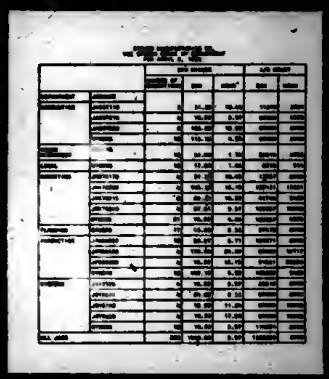

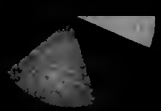

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SURVEY from page 1

to recommend it to others. The six users gave the system an overall satisfaction rating of 3.33. IBM'e System/34 received a 3.35 overall satisfaction rating, and the System/38 received a 3.47.

■ Microdata Corp.'e Sequel line of minis rated the highest in overall satisfaction among users polled. It received a 3.65 score, according to Datapro.

Other systems receiving high overall satisfaction marks include: NCR Corp.'e 9300, with a score of 3.54; Digital Equipment Corp.'s VAX-11, which scored a 3.42; Burroughs Corp.'e B1900, receiving a mark of 3.40; and Hewlett-Packard Co.'e HP 3000, which was rated at 3.47.

■ Roughly half (51%) of minicomputer users have taken steps to develop a disaster recovery plan. That is the same percentage recorded in last year'e survey.

However, during 1984, more users (17%) plan to implement a disaster recovery plan. That percentage is 2% more than last year, according to Datapro.

■ The integrated office still appears to be more of a concept than a reality.

Defining an integrated office system as one that ties together discrete pieces of office equipment to make information more accessible to users, 33% of survey respondents said they have made a commitment to implement such a system. But only 17% said they had plans to develop an integrated office system during 1984.

Defining an integrated office system as one that links office equipment to make information accessible, only 17% of the respondents said they had plans to develop such a system during 1984.

■ IBM's System/36 took the honors for compatibility. Asked to rate the compatibility of hardware and programs carried over from other systems, respondents to the Datapro survey gave the System/36 ratings of 3.54 and 3.53, respectively. IBM'e System/23 received the lowest mark for hardware compatibility, and Hewlett-Packard'e HP 1000 received the lowest marks for software compatibility.

■ HP, IBM and NCR received the highest overall survey ratings for service.

According to the Datapro survey, HP and NCR topped the list in the categories of maintenance responsiveness and effectiveness.

When it comes to technical troubleshooting, IBM and HP took top honors. And users polled rated IBM documentation as best.

How Datapro rates satisfaction

DELRAN, N.J. — Datapro Research Corp.'s 1984 survey was based on the results of 15,000 questionnaires mailed to known mainframe and minicomputer user sites. The list of computer sites was supplied by the Framingham, Mass.-based market research firm, International Data Corp. (IDC).

Of the 15,000 questionnaires, 3,404 responses were received from 3,261 respondents (a 22% return). Of the total responses, 352 were judged to be invalid. The result was 3,052 valid responses from 2,909 users. Of the valid responses, 1,079 rated mainframe computer systems (an 18% return on the 6,000 surveys mailed to mainframe users) and 1,973 rated minicomputers (for a return of 22% on the 9,000 surveys mailed to minicomputer users).

Copies of the "1984 User Rating of Computer Systems" cost $29 and are available from Datapro at 1805 Underwood Ave., Delran, N.J. 08075.

Communications system will link Democratic convention delegates

By James Connolly
CW Staff

SAN FRANCISCO — The first U.S. political gathering at which all of the key participants — 57 state and territorial delegations spread throughout 37 hotels — will be linked by a high-speed computer network, opens here today as 8,000 democrats gather for the Democratic National Convention.

Each delegation's headquarters suite, the Hilton Hotel media headquarters, the Democratic National Committee headquarters and the convention site itself, the Moscone Center, will be equipped with a total of 100 NCR Corp. Desktop Model 4 microcomputers tied together by dedicated telephone lines.

The network, the largest of several computer networks being used at the convention, is being provided by a year-old start-up company, American Network Services (ANS) of Burlingame, Calif. The system, which ANS President Alan Saffron valued at $500,000, is being provided free in exchange for ANS being designated as an "official provider" for the convention.

In addition, Apple Computer, Inc. and ANS provided the convention committee workers with personal computers, the Apple Macintosh and the NCR Model 4, for tasks such as word processing, credentials processing and producing artwork, including signs and presentation materials.

Another network will provide delegates and other officials with messages while they are at the convention hall. That network uses videotex monitors linked to twin Digital Equipment Corp. VAX-11/780 superminicomputers.

Delegates can use terminals spread throughout the convention center and selected hotels to scroll through a list of names of persons who have messages waiting and to retrieve those messages.

Democratic officials can use ANS' network, Guestnet, built around an NCR Tower 1632 minicomputer at ANS' office, as a message center to contact other delegations through electronic mail and for stand-alone computing, running applications such as Context Management Systems, Inc.'e Context MBA and Lifetree Software, Inc.'e Volkswriter on the microcomputers.

"The host committee will be able to tap in a message about meetings or schedule changes that will go out to all of the delegation suites or selected suites. The system will allow simultaneous data communications between each site and with the Democratic National Committee headquarters in Washington, D.C.," Saffron said.

Within the hotels, data will be carried on 9,600 bit/sec dedicated lines and on 56K bit/sec lines across the city. All of those lines were installed by Pacific Bell Telephone Co. and will be left in place for ANS use after the convention.

The network is the first large-scale test of the ANS service, which uses Case-Rixon, Inc. and Gandalf Data, Inc. multiplexers and other communications equipment.

Beginning in the autumn, ANS will be offering similar services to business travelers in major chain hotels across the U.S., with intercity communications carried on AT&T Communications T1 1.544M bit/sec trunk lines.

Saffron said that hotels, beginning with Holiday Inn'e Crown Plaza hotels, will let guests use NCR computers in their rooms for about $30 per day.

Pascal users to meet in Toronto

TORONTO — Usus, Inc., the UCSD Pascal users society, will hold its semiannual national meeting at the Hotel Plaza II here October 12-14. The meeting will feature technical presentations, hardware and software demonstrations, language tutorials, special interest group meetings and software library exchange.

Usus represents users of the UCSD Pascal system and its derivatives, including the University of California'e UCSD P-system and Apple Computer, Inc.'s Apple Pascal. Among the special interest meetings are those for users of IBM Personal Computers, Apple Computer, Digital Equipment Corp., Texas Instruments, Inc. and Sage Computer Technology, Inc.

Registration fees are $25 prior to Sept. 21 and $35 at the door. Nonmembers are invited. Usus may be reached through P.O. Box 1148, La Jolla, Calif. 92038.

Users Rate T

Survey Item / Manufacturer and Model	Burroughs B 1800	Burroughs B 90	Burroughs B 900	Burroughs B 1900	Data General CS Series	Data General
[illegible]						
System Ratings (4.0-1.0)						
Ease of Operation	4.00	3.22	3.40	3.55	3.30	
Reliability of Mainframe	3.80	3.50	3.60	3.46	3.26	
Reliability of Peripherals	3.60	3.17	3.20	3.13	3.18	
Maintenance Service						
Responsiveness	3.80	3.39	3.40	3.28	3.39	
Effectiveness	3.60	3.22	2.80	3.03	3.13	
[illegible]						
Manufacturer's Software						
Operating System	4.00	3.19	4.00	3.57	3.14	
Compilers & Assemblers	3.60	3.25	3.80	3.34	3.09	
Applications Programs	3.20	2.67	2.67	2.90	2.71	
[illegible]						
Additional Ratings (4.0-1.0)						
Ease of Reconfiguration	3.20	3.10	3.40	3.32	2.91	
Compatibility of Hardware carried over from other systems	3.33	2.89	3.25	2.94	2.60	
Compatibility of Programs/data carried over from other systems	3.20	2.89	3.33	3.12	2.80	
Power/energy Efficiency	3.20	2.92	3.25	2.98	2.94	
Productivity Aids help keep programming costs low	3.00	2.70	3.33	2.87	2.78	
Software/Support promised by vendor	2.80	2.60	2.50	2.80	2.67	
[illegible]						
Delivery/Installation of equipment (ahead of schedule=4.0, very late=1.0)	2.80	2.83	3.00	2.73	2.74	
[illegible]						
Did the system do what you expected it to do? (%)						
Yes	100.00	94.44	100.00	90.91	100.00	
No	0.00	5.56	0.00	5.58	0.00	
Undecided	0.00	0.00	0.00	3.50	0.00	
[illegible]						

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	Data General Eclipse/MV	Datapoint All Models	Digital Equipment PDP-11	Digital Equipment VAX-11	Four-Phase All Models	Harris All Models	Hewlett-Packard 1000	Hewlett-Packard 3000	Honeywell DPS 6	IBM Series-1
3.33	3.42	3.12	3.44	3.53	3.23	3.00	2.89	3.48	3.31	3.00
3.58	3.49	3.41	3.55	3.58	3.19	2.71	3.56	3.70	3.03	3.53
3.33	3.36	3.45	3.42	3.33	2.87	2.60	3.13	3.61	2.91	3.29
3.04	3.40	3.47	3.44	3.27	3.26	3.00	3.19	3.52	3.28	3.40
2.98	3.37	3.12	3.37	3.17	3.13	2.71	3.67	3.53	3.13	3.60
3.30	3.38	3.16	3.47	3.52	2.96	2.86	3.25	3.46	3.17	2.93
3.11*	3.15	3.00	3.27	3.45	2.88	2.14	3.25	3.38	3.25	2.92
2.98	3.18	2.52	3.09	3.00	2.65	2.50	2.98	3.06	2.85	2.77
3.06	3.20	2.97	2.99	3.24	2.73	2.57	2.33	3.26	3.03	3.15
2.98	2.85	2.10	3.13	3.11	2.24	2.14	2.56	2.80	2.77	2.69
2.80	2.84	2.23	2.84	2.81	2.41	2.71	2.22	3.04	2.52	2.54
2.92	3.27	3.21	2.98	2.94	2.98	2.71	2.75	3.23	3.10	3.31
2.88	2.92	2.07	2.69	2.92	2.59	2.14	2.56	3.09	2.59	2.85
2.83	2.95	2.47	2.87	2.90	2.88	2.43	3.22	3.01	2.59	2.46
2.90	3.09	2.68	2.83	2.83	2.89	2.99	2.78	2.99	2.78	2.67
6.36	83.72	88.29	90.44	93.39	100.00	51.14	100.00	98.73	84.95	73.33
1.82	6.98	11.76	2.94	2.46	0.00	28.57	0.00	0.00	6.06	13.33
1.82	9.30	2.94	6.62	4.13	0.00	14.29	0.00	1.27	9.09	13.33

Users Rate T

Survey Item \ Manufacturer and Model	IBM System/23	IBM System/34	IBM System/36	IBM System/38	IBM 8100	MAI/Basic Four
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Purchase	62 31	71 82	62 66	61 54	80 00	83
Rental or Lease from Mfr.	7 69	18 24	16 42	11 31	40 00	16
Lease from 3rd Party	0 00	10 14	20 90	27 16	0 00	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Technical Support						
Trouble-shooting	2 83	3 06	3 17	3 01	3 17	2.
Education	2 42	2 92	3 23	2 87	3 17	2
Documentation	2 76	2 87	3 26	3 00	3 17	2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ease of Programming	2 92	3 16	3 45	2 87	3 00	3.
Ease of Conversion	2 87	2 99	3 62	2 64	3 00	3.
Overall Satisfaction	2 67	3 35	3 67	3 47	3 33	3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Keeping up with & implementing vendor changes to hardware/software (very easy = 4 0; very difficult = 1 0)	2 99	3 10	3 39	3 26	2 67	2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delivery of required Software (ahead of schedule = 4 0; very late = 1 0)	2 48	2 93	3 03	2 99	3 20	2.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Would you recommend system to another user? (%)						
Yes	69 23	95 27	97 01	98 20	100 00	75
No	30 77	1 35	0 00	0 90	0 00	16
Undecided	0 00	3 38	2 99	0 90	0 00	8

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... All Models	MDS/Qantel All Models	Microdata Reality	Microdata Sequel	NCR 9000	NCR 9300	Perkin-Elmer 3200	Prime 50 Series	Sperry System 80	Wang VS	Minicomputers Other Models
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...33	55.56	77.19	57.14	47.76	76.92	80.95	56.90	37.29	70.15	76.19
...67	16.67	7.02	0.00	34.33	7.69	4.76	28.45	52.54	14.18	4.76
...00	27.78	15.79	42.86	17.91	15.38	14.29	14.66	10.17	15.67	19.05
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...75	3.11	2.89	3.00	2.88	3.23	2.67	2.70	2.80	2.63	3.26
...42	2.88	2.64	2.62	2.88	3.15	2.37	2.73	2.45	2.64	3.13
...00	2.71	2.58	2.86	2.65	3.00	2.43	2.80	2.44	2.55	2.86
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...50	3.31	3.46	3.80	3.37	3.31	2.86	3.26	3.17	3.62	3.24
...00	3.53	3.23	3.45	3.14	3.31	2.94	3.19	2.78	3.44	2.88
...06	3.33	3.34	3.66	3.24	3.54	2.90	3.29	2.98	3.34	3.39
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...75	3.44	3.39	3.24	3.11	3.31	2.57	3.08	2.86	3.02	3.10
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...73	2.88	2.78	3.05	2.77	2.75	2.80	3.02	2.79	2.80	2.83
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
...00	88.89	87.72	100.00	83.58	100.00	61.90	91.38	76.27	91.86	84.61
...67	5.56	7.02	0.00	5.97	0.00	23.81	3.45	10.17	1.48	5.13
...33	5.56	5.26	0.00	10.45	0.00	14.29	5.17	13.56	6.67	10.26

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Survey Item \ Manufacturer and Model	Burroughs	Data General	Datapoint	Digital Equipment	Four-Phase	Harris
No. of User Responses	371	[illegible]	[illegible]	379	31	9
Avg. Life of System (months)	38.5	[illegible]	[illegible]	48.7	62.6	34.6
Acquisition Method (%)						
Purchase	64.12	[illegible]	64.31	77.61	3.23	71.43
Rental or Lease from Mfr	36.47	1.06	26.47	4.86	61.29	0.00
Lease from 3rd Party	8.41	14.79	9.82	16.45	35.48	28.57
System Ratings (4.0-1.0)						
Ease of Operation	3.52	3.36	3.12	3.50	3.23	3.00
Reliability of Mainframe	3.48	3.48	3.41	3.57	3.15	2.71
Reliability of Peripherals	3.15	3.31	3.45	3.36	2.57	2.50
Maintenance Service:						
Responsiveness	3.31	3.23	3.47	3.33	3.26	3.00
Effectiveness	3.06	3.15	3.12	3.24	3.13	2.71
Technical Support:						
Trouble-shooting	2.76	3.16	[illegible]	[illegible]	2.94	2.71
Education	2.71	2.77	3.21	2.87	2.77	2.00
Documentation	2.45	[illegible]	2.52	2.96	2.58	2.00
Manufacturer's Software:						
Operating System	3.66	3.30	3.15	3.50	2.96	2.86
Compilers & Assemblers	3.36	3.12	3.00	3.39	2.88	2.14
Applications Programs	2.86	2.90	2.52	3.03	2.85	2.50
Ease of Programming	[illegible]	[illegible]	[illegible]	3.07	3.06	3.43
Ease of Conversion	[illegible]	[illegible]	[illegible]	3.02	2.48	2.86
Overall Satisfaction	[illegible]	[illegible]	[illegible]	3.36	3.07	2.71
Additional Ratings (4.0-1.0)						
Ease of Reconfiguration	3.31	3.08	2.97	3.15	2.73	2.57
Compatibility of Hardware carried over from other systems	2.85	2.86	2.10	3.12	2.24	2.14
Compatibility of Programs/data carried over from other systems	3.11	2.86	2.23	2.75	2.41	2.71
Power/energy Efficiency	2.99	3.06	3.21	2.92	2.98	2.71
Productivity Aids help keep programming costs low	2.87	2.75	2.07	2.84	2.55	2.14
Software/Support promised by vendor	2.51	2.75	2.47	2.99	2.98	2.43
Keeping up with & implementing vendor changes to hardware/software (very easy=4.0; very difficult=1.0)	[illegible]	[illegible]	[illegible]	[illegible]	3.14	2.88
Delivery/Installation of equipment (ahead of schedule=4.0, very late=1.0)	2.75	2.84	2.88	2.70	2.89	2.98
Delivery of required Software (ahead of schedule=4.0; very late=1.0)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.71
Did the system do what you expected it to do? (%)						
Yes	81.51	92.86	86.29	92.33	100.00	57.14
No	5.25	3.31	11.75	2.65	0.00	28.57
Undecided	2.92	4.13	2.84	5.03	0.00	14.29
Would you recommend system to another user? (%)						
Yes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	57.14
No	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.29
Undecided	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	28.57

nall Business Systems

Hewlett-Packard	Honeywell	IBM	MAI/Basic Four	MDS/Qantel	Microdata	NCR	Perkin-Elmer	Prime	Sperry	Wang	Other Minicomputers
[illegible] 44.6	33 33.3	471 35.2	12 30.7	18 48.3	78 44.7	80 27.9	21 41.0	118 34.8	[illegible] 36.1	136 35.8	42 54.3
79.98 10.51 8.70	75.76 5.06 18.18	[illegible] 14.07 [illegible]	83.33 16.67 0.00	[illegible] 16.67 27.78	71.79 5.13 23.08	[illegible] [illegible] 17.50	[illegible] 4.76 14.29	[illegible] 28.45 14.66	37.29 52.54 10.17	79.75 44.18 [illegible]	76.19 4.76 19.05
3.45 3.98 3.99 3.54 3.54	3.31 3.03 2.91 3.29 3.13	3.45 3.79 3.97 3.47 3.49	3.42 3.25 3.00 3.33 3.06	3.98 3.72 3.57 3.61 3.91	3.98 3.33 3.14 3.41 3.25	3.45 3.59 3.53 3.96 3.52	2.79 3.92 3.38 3.10 2.95	3.41 3.90 3.37 3.39 3.17	3.34 3.39 3.19 3.42 3.32	3.74 3.53 3.26 3.11 3.06	3.91 3.64 3.98 3.37 3.20
3.17 2.98 2.80	2.71 3.00 2.86	3.04 [illegible] 3.02	2.75 2.42 2.80	2.15 [illegible] 2.71	2.82 3.64 2.85	2.85 3.84 2.71	2.67 2.37 2.48	2.70 3.73 2.80	[illegible] 2.45 2.44	2.63 3.04 3.05	3.26 2.15 2.96
3.45 3.37 3.05	3.17 3.25 2.98	3.45 3.47 2.98	2.92 2.90 2.91	3.44 3.36 3.17	3.86 3.42 3.06	3.25 3.23 2.82	2.91 2.86 2.45	3.33 3.00 2.78	3.19 3.22 2.70	3.36 3.37 2.98	3.45 3.32 2.90
3.26 3.11 3.44	3.05 2.80 3.97	3.44 2.89 2.42	[illegible] 3.80 2.86	3.31 [illegible] 2.33	[illegible] [illegible] 3.42	[illegible] 3.10 [illegible]	[illegible]	[illegible] 3.19 3.29	3.17 2.78 [illegible]	[illegible]	[illegible]
3.21 2.79 2.98 3.21 3.05 3.02	3.03 2.77 2.92 3.10 2.58 2.98	3.05 2.92 2.72 3.17 3.25 3.01	3.09 2.82 2.50 3.00 2.58 2.45	3.76 2.63 2.90 3.90 3.38 2.94	3.30 2.84 2.79 2.97 3.00 2.75	3.37 3.01 2.98 3.21 2.90 2.79	2.86 2.44 2.96 2.84 3.28 2.28	3.27 3.30 3.09 3.12 2.97 2.91	2.92 2.26 2.98 3.19 2.83 2.60	3.54 2.21 2.97 3.07 3.38 2.91	3.03 2.90 2.70 3.17 2.98 2.98
3.26	2.81	3.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.98	2.79	2.98	2.79	3.00	3.00	2.91	2.90	3.10	2.81	2.57	3.06
2.94	2.84	2.87	2.73	[illegible]	[illegible]	2.77	[illegible]	[illegible]	2.79	[illegible]	[illegible]
98.90 0.00 1.20	84.85 9.06 9.06	93.83 2.77 3.40	93.33 9.33 9.33	93.33 11.11 5.98	91.03 2.98 9.41	91.26 3.75 5.00	78.19 14.29 5.52	93.04 2.91 4.35	81.36 15.25 3.39	92.59 2.98 4.44	92.86 4.79 2.38
92.13 2.42 5.45	76.09 [illegible] 18.75	[illegible] 2.76 2.34	[illegible] 16.67 [illegible]	[illegible]	[illegible]	[illegible]	[illegible] [illegible] 14.29	[illegible]	[illegible]	[illegible]	[illegible]

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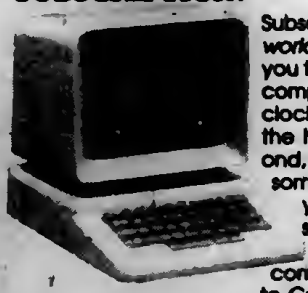

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COMPUTERWORLD

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Maintenance key to software choice: IMF DP manager

CW AT NCC

By Bryan Wilkins
CW Washington Bureau

LAS VEGAS — The International Monetary Fund (IMF) needed to install software to drive its data bases. Maintaining it, however, emerged as the major factor in selecting which products to install.

Addressing the National Computer Conference session on software maintenance here last week, James McKee, DP manager at the IMF in Washington, D.C., said 32% of the IMF's computer systems costs were devoted to software upgrades in order to get 10 years of use from it.

"We really redevelop software again and again," reported McKee, who said that IMF programmers spend 75% of their time performing program upgrades. "The maintenance must be built into the design, and the documentation must describe what can and cannot be done to avoid having the programmer going down dead ends, repeatedly."

Polling end users is another important method that DP managers should use to find out what software needs to be upgraded, session attendees were told.

At Texaco, Inc., a major project to overhaul completely the 7.3 million lines of code has been aided by in-house-generated software management programs that keep track of program aborts, according to the company's G.L. Richardson.

A relational data base management program is then applied to monitor what particular code is in need of critical and immediate attention, he said. Texaco has installed a central library to store upgraded software programs, which are then shipped out to end users.

Other methods of software maintenance outlined at NCC '84 revealed the consensus that new emerging fourth-generation software programs will be coming to the market with increasing frequency.

They will aid programmers to keep their existing software investments usable for longer periods, specialists indicated.

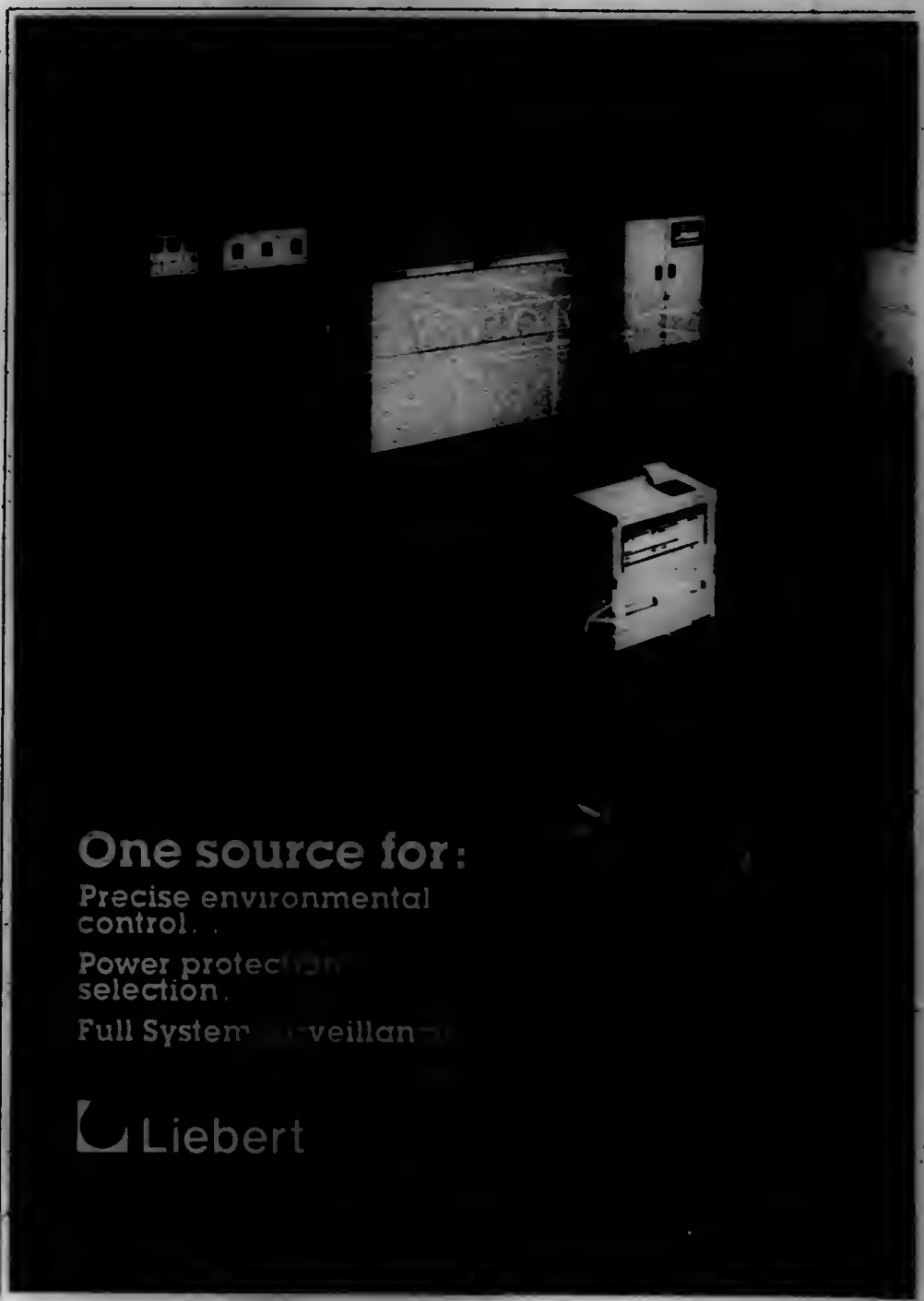
Martin Sellers, a panelist from the On-Line Computer Library Corp. (OCLC) in Dublin, Ohio, said the installation of a user contact point halted a "deteriorating situation."

Meet set for DSSD users

TOPEKA, Kan. — A conference has been announced to provide users of the Data Structured Systems Development (DSSD) Methodology with a forum to share experiences, concerns and discoveries. Feedback '84, the 9th Annual DSSD Users Conference is sponsored by Ken Orr & Associates, Inc. and will be held at the Holidome here Oct. 2-4.

"Engineering Industrial-Grade Information Systems" will be the theme of Feedback '84. Speakers in the field of information engineering will discuss real-time systems, enterprise planning, reusable software, productivity tools and techniques, function models and metrics.

The registration fee is $500, or $450 if paid before Sept. 1. More information is available from Ken Orr & Associates, 1725 Gage Blvd., Topeka, Kan. 66604.



Telecommuting said to benefit employers, workers

CW AT NCC

LAS VEGAS — The changing nature of the work force and advances in technology are spurring interest in "telecommuting," the process by which employees who work at home are linked electronically to their offices, a panel told a National Computer Conference audience here last Tuesday.

According to Gil E. Gordon, a N.J.-based consultant who specializes in human resource management, technological developments in hardware and software have made telecommuting a feasible alternative to the traditional office environment.

Telecommuting offers advantages to both companies and employees, Gordon said. For businesses faced with the rising cost of office space, telecommuting offers a method for cutting costs. In a typical metropolitan area, a firm spends about $40,000 to $60,000 per employee for office space, Gordon noted.

Telecommuting has other benefits, Gordon noted. Companies that have implemented telecommuting have found that it results in significant productivity gains, some that measure as high as 15%.

For employees, the ability to work at home offers the opportunity to design a more flexible work life, whether the worker is a young parent trying to balance home and a career or an employee whose personal work style is better suited to working at home, Gordon said.

Steve Shirley, president of F International, a British computer consulting firm that depends on telecommuting — 93% of its employees work out of their homes — pointed out that companies have a lot to gain from telecommuting.

A business will no longer lose expensively trained employees if it can offer them an alternative working environment. In some cases, companies have found that their ability to recruit new employees is increased. With telecommuter-based employees, a company can respond to changing market conditions with greater ease and implement expansion plans with greater speed.

Richard Harkness, director of marketing strategy for Compression Labs, Inc., a San Jose, Calif.-based firm, described telecommuting as "one step in a revolutionary process" that is decentralizing the work place.

One form that telecommuting has taken can be seen in the "neighborhood office center." Unlike the "satellite office center," where a company moves different departments to various locations, the neighborhood center offers workers the chance to perform their particular job at a site close to their homes.

AT&T 6300 gets system

By Eric Bender
CW Staff

AT&T has announced plans to offer Digital Research, Inc.'s Concurrent PC-DOS for the AT&T Personal Computer 6300.

The operating system, which supports applications written for both IBM's PC-DOS and Digital Research's Concurrent CP/M, will be offered in fourth-quarter 1984, AT&T said. Pricing was not disclosed at press time.

When AT&T introduced its Model 6300 IBM-compatible micro last month, Microsoft Corp.'s competing MS-DOS operating system was priced separately.

Both AT&T and Digital Research officials emphasized the benefits of concurrent, multitasking operations and said that Concurrent PC-DOS would provide a bridge between today's personal computers and the more powerful multiuser systems.

Digital Research is based at 160 Central Ave., Pacific Grove, Calif. 93950.

DP manager profile depicts 'high-growth-need' person

CW AT NCC

By John Desmond
CW Staff

LAS VEGAS — Data processing managers are high-growth-needs people who see their jobs as rich in opportunity.

So said J. Daniel Couger, University of Colorado professor of computer and management science, who spoke at last week's National Computer Conference here.

Couger outlined a model of motivation for DP managers for his audience. Research surveys, he said, have shown that the five most important variables of a data processing manager's job are skill variety, task identity, task significance, autonomy and feedback from the job itself — the same five job characteristics most important to non-DP management, Couger said.

Couger used two terms in the motivation theory to describe DP managers in relation to non-DP managers. Growth-need strength (GNS), he said, is a primary indicator of an individual's need for a richly rewarding job. Motivating-potential score (MPS) is a value reflecting the potential of a job for inspiring employees to be self-motivated.

On a scale of one to seven, seven being the highest value, DP professionals rated 5.91 in GNS vs. 5.59 for other professionals, Couger said, citing recent university research results from studies on over 6,000 workers. On the MPS scale, a relative scale, DP professionals rated 153.6 vs. 153.7 for other professionals.

The research found that for programmer/analysts, autonomy rated 5.48 on the one-to-seven scale of important job characteristics, or "core job dimensions." Autonomy was second in importance to task significance, which rated 5.72 for programmer/analysts.

Task significance is what the DP professional considers meaningful about the job. Couger need an example of DP managers working for Christian religious organizations in a college campus network. "They had outdated, donated equipment, and they were working with a dead language," he said.

How could that organization attract skilled professionals? A low percentage of workers, enough to fill the required jobs, had "personal goals in tune with the work of the organization," Couger said, so they were willing to make task significance their overwhelming consideration in taking the job.

Skill variety, the challenge to an individual's skills and abilities posed by a job, was the next most important job factor for programmer/analysts, rating a 5.45. Couger said that when one company changed its computer technology, a former programmer/analyst was transformed into an eight-hour-per-day terminal operator. Couger called the shift "demotivating."

Task identity, derived from completing a whole and identifiable piece of work, rated a 5.29 on the job dimension scale for programmer/analysts, Couger said. When production line workers were shown how their job related to the final product, productivity increased significantly, Couger said.

Speakers say perseverance with graphics will pay off

CW AT NCC

By David Olmos
CW Staff

LAS VEGAS — The road to the successful use of business graphics has some pitfalls, but the benefits can be more than just prettier pictures for corporate presentations, according to three graphics specialists who spoke at last week's National Computer Conference here.

The market for graphics-related hardware and software is growing at an annual clip of 30% to 40%, according to David Ackmann, a senior consultant for interactive computing with Monsanto Corp. in St. Louis. This growth, he said, is attributable to the many companies that have found that business graphics is an essential tool in their information center.

C. Royce Claytor, a project analyst with Virgina Electric Power Co. (Vepco) in Richmond, Va., traced the history of how her company went from practically no use of business graphics four years ago to a full information center with a variety of graphics software and hardware today.

Vepco first started using SAS Institute, Inc.'s SAS/Graph in 1980. The program proved popular with employees of various departments, and soon the company ran into problems because of too many requests for plotters and because turnaround time was slow. "SAS/Graph was the first package that brought the excitement of color graphics to our company," she said.

One potential drawback of SAS/Graph, she said, is that users should already have a working knowledge of the vendor's SAS program, or else they are at a "significant disadvantage."

Her company also uses IBM's Graphical Data Display Manager (GDDM) and its Departmental Reporting System with Business Graphics. The primary advantage of GDDM, Claytor said, is that "any person can create a graph in a short amount of time with no programming skill whatsoever."

According to Claytor, the most important thing to remember in putting in a graphics system is communication between users and between users and the MIS department.

Roger Muller, head of technical services support for agricultural marketing with Eli Lilly & Co. in Indianapolis, discussed his company's use of SAS/Graph and Issco Graphics, Inc.'s Tell-A-Graf package.

Muller said SAS/Graph is a particularly good tool for "exploratory data analysis," in which the user can better interpret data.

He said Tell-A-Graf is particularly useful in situations in which someone has a rough sketch of a chart, but wants to produce it by computers.

Muller said the use of graphics software has contributed to "tremendous" cost savings and improved business meetings. Putting information in graphics form also has meant that data is more carefully examined.

Gary Beshara, a research scientist with Amoco Production Co. in Tulsa, Okla., said his company also uses the SAS/Graph and Tell-A-Graf packages. The Tell-A-Graf package "is by far the most heavily used" at his company, he said.

Beshara suggested that any company implementing graphics on a large scale should provide an adequate supply of in-house CRT terminals, clusters of printers and plotters easily accessible to users and centralized placement of high-resolution devices.

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NEWS

Cincom adds to software line

By John Gallant
CW Staff

LAS VEGAS — Cincom Systems, Inc. continued the recent expansion of its software products line with the introduction at the National Computer Conference here last week of a set of Unix-based tools and a Wang Laboratories, Inc. VS version of its Mantis fourth-generation application development system.

The product announcements mark the third in a series of major software introductions by the Cincinnati-based vendor this year. In January, Cincom unveiled the Manage User series of mainframe decision support tools and the Cricket IBM Personal Computer XT/370 version of Mantis. The company then added its Net/Master network management system and Series One Plus micro decision support tools in May.

According to a spokesman, the CS/Xtend set of Unix tools announced at NCC '84 is a fully integrated series of application development aids and end-user productivity tools. The five products in the CS/Xtend line are currently compatible with the System III and Version 7 versions of Bell Laboratories' Unix operating system and will be ported in the future to the AT&T-supported Unix System V.

The CS/DBX Data Base Executive was described as a high-performance, multiuser, shared data base management system that is fully compatible with Cincom's Total DBMS. The spokesman said mainframe or minicomputer applications designed for use with Total can be ported to Unix systems with CS/DBX, and applications for Hewlett-Packard Co.'s Image DBMS can also be adapted for use with the product. It is said to accommodate network and hierarchical data structures and, through a sequential view processor, to support inversion capabilities.

The spokesman said the CS/TMX Terminal Management Executive is an application development aid that provides facilities for generating, coding and maintaining CRT screen displays independently of user-written programs. A runtime monitor handles all of a program's terminal I/O activities.

The CS/RMX Retrieval Management Executive is said to provide relational access to the data base for inquiries and report writing and to allow end users to retrieve selected information through English-like commands.

CS/Xpress Application Builder is an interactive, interpretive system that allows end users to create application systems. With the product, a user can interactively design a screen format and describe each field's data edit characteristics. After completing an application, a user can enter and edit data and store it in the data base.

The CS/Xport Distributed System interface was described as control software used to pass information from one Unix-based computer to another. A program running on one processor can directly access data maintained in a CS/DBX or Total data base maintained on another.

The spokesman said that, depending on the configuration of CS/Xtend tools purchased and the number of users supported, the price ranges from $675 to $66,150. The products are available separately and will be marketed through Cincom's Ventures Division.

The VS Mantis version of Mantis for the Wang VS line is said to be compatible with all Mantis applications created in IBM environments. Mantis is an on-line, interactive application development system that allows programmers to create screens and files, write programs and test and debug applications for production environments.

VS Mantis is scheduled for shipment in September. It will be marketed jointly by Cincom's Ventures Division and Wang and will cost $25,000.

Cincom Systems is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

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NEWS

NCC network demo links vendors with OSI protocol

CW At NCC

By John Dix
CW Staff

LAS VEGAS — Sixteen organizations cooperated at the National Computer Conference last week in a demonstration of how information systems from different manufacturers can communicate using networks and a recently specified high-level protocol standard.

The National Bureau of Standards (NBS), General Motors Corp. and Boeing Computer Services Co. coordinated the demonstration, which was divided into two projects: the development, testing and demonstration of an industrial network, funded by GM; and a network for business use, jointly funded by NBS and participating vendors.

The International Standards Organization's transport protocol was implemented over both networks. This is the protocol specified at the fourth level of the standards body's seven-layer Open Systems Interconnection (OSI) reference model for network architectures.

The lower levels of that model specify the physical connectors and the data formats used by communicating devices. These layers were addressed by the local networks used in the demonstration.

Nine companies participated in the business network, which was built on an Ethernet-type, IEEE 802.3 standard bus network. They included: Advanced Computer Communications; Boeing Computer Services; Charles River Data Systems, Inc.; Digital Equipment Corp.; Hewlett-Packard Co.; Honeywell, Inc.; ICL, Inc.; Intel Corp.; and NCR Corp.

The industrial project used a token-bus local net, and its participants were Allen-Bradley; Concord Data Systems, Inc.; DEC; Gould Modicon; HP; IBM; and Motorola, Inc.

The type of local network used was "relatively immaterial" to the demonstration, according to Sheldon Blauman, manager of network architecture planning at Boeing Computer Services. "GM [was] running the same higher level protocols that we [were], but on a different local network," Blauman said. "It doesn't really matter what type of local network you're using."

Each of the computer companies involved had to develop its own implementation of the OSI transport protocol standard and then test it against a system within either GM or NBS. Once past that benchmark, each vendor's implementation was then tested against the protocols developed by other vendors within the project.

The transport protocol is the highest level of the OSI reference model fully specified. Once implemented by vendors — as the demonstration was meant to illustrate — the protocol would provide for the "reliable transfer of data in proper sequence between interacting processors," said Jim Isaak, director of product marketing at Charles River Data Systems.

"When you drop 100 packets into a network, you don't know what order they will arrive in at the destination; that's not guaranteed until you get to layer four of the OSI," Isaak explained. "This layer worries about making sure that when 100 packets go into a net, 100 packets come out, and they come out in the right order."

A sequencing guarantee is needed because if a packet is destroyed in transmission, by the time a replacement packet can be sent, the receiver may have accepted other packets intact, skewing the order of delivery.

If all vendors supported this standard, a solution to the problem of networking multivendor machines would be facilitated greatly, but not fully resolved. "The transport layer ensures that a stream of data coming through to an application program is properly sequenced, but it might be in Ebcdic code when you wanted Ascii," Isaak said.

Concern over things such as the type of code used by communicating devices were addressed at the higher levels of the OSI model. For purposes of demonstration, the vendors participating in the NCC '84 exhibit had developed a file-transfer protocol modeled after a subset of a higher level OSI protocol that was not yet fully specified.

The file-transfer protocol subset corresponds to elements within both layers six and seven of the reference model, the presentation and application layers, respectively. Using this protocol, vendors at the demonstration were able to request a listing of files on a specific machine and then read those files.

Eventual compatibility predicted between SNA, OSI net architectures

By John Dix
CW Staff

BOSTON — Users can embrace IBM's Systems Network Architecture (SNA) today without fearing that it will preclude the use of networking standards in the future, according to the Yankee Group, a market research firm based here.

Dale Kutnick, executive director of the firm, said in a recent interview at the Yankee Group's offices that differences between IBM's SNA and the Open Systems Interconnection (OSI) network model, under development by the International Standards Organization, will largely be gone by the time the standard is fully specified and implemented.

As network architectures, both SNA and the OSI are meant to dictate the logical construction of computer networks to provide for, among other things, controlled interaction between network resources.

Both SNA and the OSI are layered architectures. The layers are meant to ensure device compatibility. At the lower levels of the architectures, for example, the physical and link levels dictate, respectively, the type of interfaces and the protocols used. The higher layers control access to and interaction with actual applications.

Only the first four layers of the OSI seven-layer network architecture model have been fully specified. "If all goes well, OSI could be fully specified by late 1986," Kutnick said. "But after that, it still has to be implemented by vendors, which could take another 12 to 18 months."

In the meantime, SNA continues to meet with acceptance. The Yankee Group estimates that over 60% of IBM's large customer sites are using at least some SNA. These sites are typically recognized by the existence of Tcam or Vtam access methods. The firm estimates that by 1987, the year in which Kutnick expects to see the first OSI implementations, SNA will have "taken over" 75% of IBM's largest mainframe sites.

It is, nonetheless, IBM's intent to adapt SNA to make it look more like the OSI, Kutnick said. "As OSI gets fully specified and accepted, IBM will write bridges for OSI or rewrite some levels within SNA" to provide for compatibility. As an indication of that intent, IBM's most recently announced version of its Synchronous Data Link Control protocol has a modulo count — the number of frames containing data sent before an acknowledgment is sought — of 128, the same count used in the OSI's High-Level Data Link Control.

Kutnick also pointed out that IBM recently announced it would support the transport level of the OSI. "By the time OSI is fully specified, [the OSI and SNA] will be very similar," he said.

Just as SNA has moved to conform to some of the OSI, Kutnick believes, the OSI will have to adopt some SNA features to be most useful.

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Career options seen expanding in telecommunications

CW AT AWC

By Rita Shaer
CW Staff

LAS VEGAS — If you have your career eye on the chief executive officer's office, AT&T's divestiture may give you a push in the right direction.

That was the message from speakers focusing on career opportunities after divestiture at the Third Annual National Conference of the Association for Women in Computing (AWC) held here the day before the National Computer Conference officially opened last week.

Divestiture is the "two-by-four people have wanted to use" as a means of persuading high-level executives that telecommunications deserves the same attention given to office automation and data processing, according to Janice Barnla of Satellite Business Systems' National Accounts Division.

Integration of these three areas, Barnla maintained, will be controlled at the executive vice-president's level in major corporations. As the integration function gets more visibility at higher corporate levels, it also offers more opportunities to move up to the chairman's office, she continued. Noting that the rapid industry growth and change currently taking place in the telecommunications industry also contribute to better career options, Barnla pointed out that it should be possible for women to be just as successful in telecommunications as they have been in the data processing area. "There are a lot more jobs now," she said, citing the emerging telecommunications specialities developing in the Big Eight accounting firms as evidence.

However, cracking the highest executive level in the corporation remains the biggest problem for professional women, Barnla said.

In addition to smoothing a path to the executive suite, divestiture has enabled entirely new business operations to form. This, in turn, has led to additional career choices, according to conference speaker Judy Craig, national manager of multitenant operations for the Chicago-based Ameritech Communications.

Multitenant operations is one of these new business areas. It involves going after all of the communications business in an entire office building and persuading the commercial tenants to share the costs of the communications services, she explained. Multitenant operations is a new business that is in some ways floundering because no one knows exactly how to go after these tenants, Craig said.

However, it is in the communications applications area that Craig sees the most opportunities for telecommunications-oriented careers. These applications include electronic mail; teleconferencing, voice mail, local-area networks, centralized word processing, message centers and voice and data communications.

Success factors comparable

By Susan Mahoney
CW Staff

LAS VEGAS — Are success factors the same for a woman as they are for a man?

The answer is "essentially yes," according to Linda Taylor, vice-president of Gaskell & Taylor Engineering in Los Angeles.

Taylor made this claim during an interview here at the Third Annual National Conference of the Association for Women in Computing (AWC) last week.

"Women unfortunately tend to get a lot of early visibility. It just comes too soon for them. So when they fail, all their failures are magnified. Their male counterparts, meanwhile, have many failures on their way up the ladder, but because they protect each other, their failures seem smaller and don't debilitate them."

Another problem unique to women, according to the former AWC president, is their inability or unwillingness to play office politics effectively.

"They just don't put enough emphasis on the implications of organizational relationships. They think office politics is a dirty word."

Taylor asserted that women are extremely goal-oriented, but make the mistake of spending too much time at their desks and not enough time developing their negotiation and communication skills.

"Women need to learn these skills. And they must learn how to compromise. Compromise does not mean giving up. It means giving in to get something in return."

When questioned on the same subject, the newly elected AWC president, Virginia Walker, concurred: "[Success factors are] not a matter of substance so much as a matter of style.

"I believe women are every bit as ambitious and discerning as men are . . . but they have traditionally exercised no foresight," she said.

Women must take risks to succeed in DP: consultant

Davis calls success fun, gives tips for career planning, warns against platforming

CW AT AWC

By Susan Mahaney
CW Staff

LAS VEGAS — Contrary to what many people may think, the computer field is not necessarily a great field for women. Not just yet, anyway.

"One reason why computing has been good to women is because all new fields are good to anybody. They have to be. They can't afford to have prejudices or barriers."

Thus asserted Dr. Ruth M. Davis in speaking on why computing is — and why computing is not — a good professional environment for women. Davis outlined her argument during the Third Annual National Conference of the Association for Women in Computing, held here last week. Davis, who founded her own consulting group after a long and distinguished public service career, cautioned her audience of 80 women against thinking of the computer industry as the best place for "platforming" themselves for the top slots in companies, and urged them to branch out.

"Women have been in the industry since its inception, and women are in every area of specialization in the computer field now. I just want to see more women in the higher risk [specialty areas]," Davis asserted.

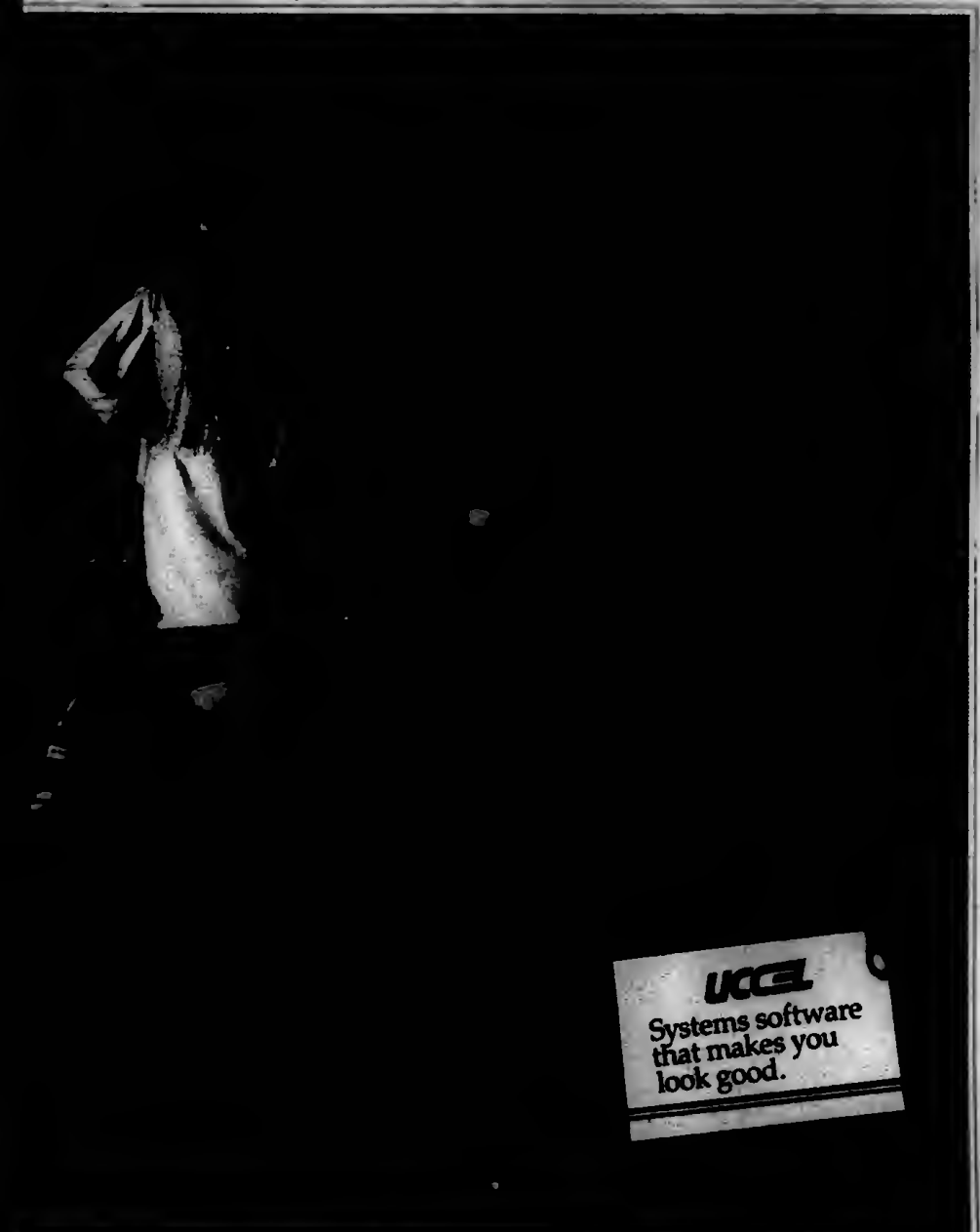
"I want to see women spread out and take risks. The road to success is absolutely dependent on your willingness to take risks," she insisted. "If you fail, no one pays much attention at all. If you succeed, then you have fun." The successful personal career path, according to Davis, is composed of three essential elements: goals and results; a process or pipeline to achieve them; and finally, the appearance of success. If it is not personal success that one seeks, but the success of a group, there is a fourth ingredient in the formula: a good infrastructure.

The success — or lack thereof — of women as a professional group troubles Davis and stems from what she calls a faulty infrastructure. "We are at a plateau, and we need a knee jerk to kick us up to the next level."

"I'm very concerned that there is only one woman chief executive officer in the Fortune 500 — Katherine Graham of the *Washington Post* . . . and I don't believe any of the reasons given for why women aren't in these positions. In fact, I think hunting for reasons for not being successful is a poor substitute for doing something significant and valid. If you aim at something significant, you don't have time to think up reasons for not succeeding," Davis chided her audience. Claiming that women have made it through the initial stage of breaking into the industry in general, she stressed that women must keep moving forward to counter a current renewed sense of resistance toward them in the work force. "Don't get comfortable," she emphasized.

"There is nothing that people are more proud of — and yet there is nothing to be more ashamed of — than a twenty-year [tenure] at the same place. That's a big yawn," Davis maintained.

"Give yourself a goal," Davis concluded. "One needs to get out and get involved in a cause when your goal is not yourself — someplace where you can really make a contribution. And remember — if you find yourself getting comfortable, you're probably not on the road to success."



Davis receives AWC award

LAS VEGAS — Dr. Ruth M. Davis, founder of the Washington, D.C.-based Pymatuning Group, was awarded the 1984 Association for Women in Computing (AWC) Award for Excellence here last week.

The award, which is also known as the Augusta Ada Lovelace Award, was bestowed on Davis by the AWC for her "outstanding public service and leadership in the inception and management of major research and development programs, her continuing support of excellence in education and her many scientific and technical accomplishments for the public good."

Dr. Davis' long list of honors and awards also include a Department of Energy Distinguished Service Medal (1981); the Department of Defense Distinguished Service Medal (1979); honorary doctorate of Engineering from Carnegie-Mellon University (1979); and the Data Processing Management Association Computer Science Man of the Year Award (1979).

Davis worked as Assistant Secretary of Energy for Resource Applications and Deputy Undersecretary of Defense for Research and Advanced Technology before founding her own consulting group in 1961.

Massachusetts breaks in criminal information system

By James Connolly
CW Staff

BOSTON — Massachusetts officials think that they have eliminated the decade-old embarrassment of telling police officers, "the machine is down," when officers radio in for information about whether motorists may be dangerous wanted criminals.

State public safety officials recently completed the connection of almost 300 municipal police departments and other law enforcement agencies to a criminal information system that features a 30-second-or-less response time for information that once took more than 20 minutes to deliver.

The commonwealth's Criminal Justice Information System (CJIS) reportedly is the first in the nation to offer statewide high-speed dedicated line service for police inquiries such as whether a person is wanted on criminal charges, whether a car or its contents have been reported stolen and whether a driver is properly licensed. The system is said to feature a 99.6% availability rate.

CJIS, which in the course of 10 years converted from 75 bit/sec teletype transmissions to a 4,800 bit/sec network, handles about 100,000 transmissions per day, according to John Cloherty, the assistant director of CJIS.

The network is based here and utilizes two Burroughs Corp. B6700 mainframes, which are being replaced this month by a Burroughs B7900 mainframe.

Cloherty said the conversion to high-speed transmissions came in bits and pieces. "It was a long, drawn-out process," he reported, a process complicated by the elimination several years ago of federal Law Enforcement Assistance Administration funding that had been counted on to help small cities and towns buy terminals.

The earlier system used 253 Teletype Corp. ASR-28 machines, which 10 years ago cost towns $200 per month, giving a town little justification for spending up to $5,000 a year to lease a high-speed terminal, Cloherty said. But prices for terminals have dropped to where CJIS participants have been paying $2,400 a year — about the same as the teletype price — for the Burroughs ET1100 and MT985 terminals and AP310-1 printers that CJIS requires.

While towns were acquiring the Burroughs terminals, CJIS was expanding its network of dedicated lines, a network for which the state pays about $1 million a year, several times what it paid for the teletype network.

That network stretches from the Burroughs mainframe across the state, with 31 trunk lines each serving up to 12 agencies. The mainframe, in turn, is linked to other data bases, such as those run by the National Crime Information Center (NCIC) in Washington, D.C., the Massachusetts Registry of Motor Vehicles in Boston and the National Law Enforcement Telecommunications Systems (NLETS) in Phoenix.

It is NCIC and NLETS that provide information about whether a person or a motor vehicle is wanted anyplace in the U.S. "A message is routed according to what is asked for. In one transaction, the officer at the police station can determine if you are wanted anywhere in the country. The first thing to come back is whether the person is wanted or not. That's the most important thing for the officer on the street to know for his own safety. I've seen it take six to eight seconds," Cloherty said.

Once a police dispatcher keys a request into a terminal, the message is routed without human intervention to all of the appropriate agencies, Cloherty said. He reported that the network also allows an officer to alert up to 26,000 agencies, linked to their own states' information systems, across the U.S. regarding wanted criminals.

"The first benefit is that the police officer on the street is much more safe than at any previous time. Number two, a private citizen is not inconvenienced as much as in the past, because they are waiting in their cars for just four or five minutes while an officer runs a check on them, instead of for 20 minutes," Cloherty said.

Solid modeling conference set

FRAMINGHAM, Mass. — An international conference for vendors, developers and current or prospective users of solid modeling systems will be held here at the Sheraton Tara Hotel Oct. 15-16.

"The Solid Modeling Revolution: Are You Ready?" is the theme of the conference, which will be cosponsored by Computer-Aided Manufacturing International (CAM-I) and "CAD/CAM Alert," a monthly publication in the computer-aided design and manufacturing field. It will be chaired by Robert H. Johnson, a consultant in computer-aided engineering.

The registration fee is $695.

For more information, contact CAD/CAM Alert at 824 Boylston St., Chestnut Hill, Mass. 02167.

Trial marks first use of video graphics as evidence

NEW YORK — For the first time in U.S. legal history, a criminal court judge here recently allowed computer-generated video graphics to be introduced as evidence in a quadruple manslaughter trial stemming from a tragic automobile accident.

Graphs and exhibits developed through computer-assisted accident analysis have long been accepted as evidence in the courtroom (CW, Jan. 30). But when Dr. Arthur Damask and Dr. Arthur Paskin, two Queens College physics professors and founders of Accident Analysis Associates, developed animated graphics on their Apple Computer, Inc. Apple II+ microcomputer, they were unaware that such video evidence had never before been introduced in court.

The video graphics Damask and Paskin produced reconstructed an accident that occurred in the early morning hours of March 13, 1983 on the Moshulu Parkway in the Bronx. Michael McHugh, 18, was the sole survivor of the crash that tore the car he was driving in half and killed his four teenage companions.

According to McHugh's attorney, Lawrence Feitell, the accident vehicle went off the road at a hairpin turn and slammed into a concrete retaining wall, ripping the car in two. The force of the crash threw the passengers from the car, killing all but McHugh. Police investigators claimed McHugh was intoxicated and failed to navigate the hairpin turn. As a result, the young man was charged with four counts of second-degree manslaughter, each carrying a possible prison sentence of up to 15 years.

But Feitell asserted that the official accident reconstruction was wrong. He said that while McHugh was attempting to steer the car back onto the parkway, the right front tire fell into a roadside utility manhole left uncovered by city workers. The tire then exploded, he claimed, and sent the car spinning into the retaining wall.

Contacted by Feitell, Damask and Paskin undertook their own analysis of events on that foggy night and determined that police investigators had indeed erred in their reconstruction. But the two professors felt their charts and diagrams alone would not be enough to explain the complex rotational and physical forces involved in the accident.

With the help of Damask's 16-year-old son Jay, the duo programmed the Apple II+ to produce four dynamic graphics scenes depicting the motion of the car before, during and after the accident. They then videotaped the scenes to make a single film to be shown on a television screen to the 12-member Bronx Supreme Court jury.

But, according to Feitell, the prosecution objected to the use of the video graphics, saying that it was inaccurate and would confuse or unfairly persuade jurors.

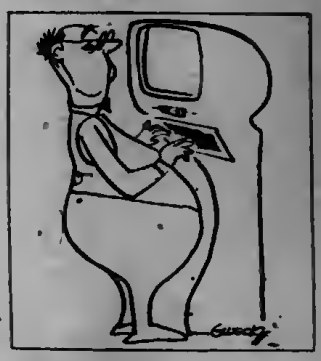
The defense, however, claimed that the video simply connected, or animated, graphics that would otherwise be allowed as evidence. After listening to the arguments, Justice John Collins ruled that the video graphics could be introduced during the trial.

In his opinion, according to Feitell, Collins said the issue of whether or not the graphics were drawn manually or mechanically with a computer was of no importance. He said the computer was not a gimmick, and the court should not be shy about its use when proper. Collins said that if the graphics evidence was based on accurate, scientific analysis, it was acceptable as an aid to the jury's understanding of the issues.

He ruled, however, that a narration by Damask that accompanied the video graphics could not be used because the prosecution would not be able to object to statements made in the audio portion.

On the basis of the video graphics and other evidence introduced during Damask's eight days of testimony, the jury acquitted McHugh following an 11-week trial that ended in May 1984. Feitell said that Collins' decision marked the first time a U.S. court has allowed computer graphics to be introduced as evidence. He said the judge's opinion carried no weight as a precedent, but it did set an example for other courts.

"His opinion was unassailable," Feitell said. "It will most certainly be followed in other jurisdictions because it has fundamental merit. Not so long ago there was a controversy over the use of photographs as evidence. Now they are commonplace. I think you will see the use of such computer graphics evidence become more common now."



MCI enters international voice market

THE CHANGING WORLD OF INTERNATIONAL COMMUNICATIONS

By John Dix
CW Staff

Part 3 of a three-part series.

Users have enjoyed the fruits of competition amongst international records carriers for overseas leased-line and message services, but for international voice communications, they have had little choice but to use AT&T. Its international voice network serves every country in the world except Cambodia, Vietnam and North Korea. More than 100 countries can be dialed directly, while the rest are reached through an operator.

Searching for a toehold in this market, MCI Communications Corp. recently signed an agreement with Belgium to provide dial-up telephone service to that country. Belgium will serve as a transit point to other countries in Europe. The company is also in the process of working out similar deals in France and Spain. This summer, MCI expects to cut over service to Australia. "During the calendar year 1984, you're going to see MCI make considerable penetration in the international voice market," a company spokesman said.

These services are provided by MCI International Telecommunications, a division of MCI International, Inc. As such, the voice side of the business complements MCI's international data/message business, called MCI/Western Union International. MCI bought Western Union International from Xerox Corp. for $195 million in 1982. By adding international voice services to its repertoire, MCI has become a full service international carrier, even more so than AT&T.

Allowed to begin offering international data services by the Federal Communications Commission's Records Competition Act, AT&T has been slow to expand into that market. Today its only offering is a 1.54M bit/sec digital service between New York and London. A company spokesman said that AT&T is "basically in the international voice market and we're getting into the other businesses slowly."

AT&T's huge presence in international voice communications, however, has seemingly stemmed the enthusiasm of the international record carriers (IRC) to enter this market, which they are permitted to do under the FCC ruling. Most of the IRCs reported that they are interested in international voice — which is growing at an estimated 20% per year — but not ready to commit to it yet.

Perhaps in the future there won't be a difference between voice and data services. Richard Kozak, vice-president of finance and administration at TRT Telecommunications Corp., said that "in a world of digital communications, where you have full digital capability, you will see carriers running voice and data along the same stream. In that regard, you will see voice carriers develop a data transmission capability and the IRCs develop a voice transmission capability."

The likelihood of this is hinged on the development of digital satellite systems and digital undersea telecommunications cables like TAT-8. The eighth trans-Atlantic cable, TAT-8 is the first fiber-optic cable. A construction and maintenance agreement to build TAT-8 was signed on June 15 by the 29 North American and European co-owners of the system. Scheduled to be operational in June 1988, the $335 million digital pipe will more than double the number of available undersea circuits and will be used to carry voice, data and video signals.

Carrier migration to all digital facilities carriers might eventually be necessitated by competition. "Postal Telephone and Telegraph [companies] (PTTs) are government controlled with only one company supplying communications services in a given country," TRT's Kozak said. "PTTs might eventually only want to connect with carriers that supply both voice and data, because it is less burdensome than connecting with a whole host of voice and data carriers."

Meet to study chip status

SUNNYVALE, Calif. — A seminar on the status of integrated circuits will be held here Aug. 22, in Minneapolis on Aug. 29 and in Boston on Sept. 19 by Integrated Circuit Engineering Corp. (ICE).

In the seminar, entitled "Mid-Term '84: Status of the Integrated Circuit Industry," ICE will address industry trends, major open-market integrated circuit producers, capacity trends, photolithography trends, gate-array and standard-cell library market trends and hot integrated circuit products.

Henri A. Jarrat, president and chief operating officer of VLSI Technology, Inc., will be guest lecturer for the seminar.

Jarrat's presentation will include an overview of the road-mapping strategies that a young, aggressive integrated circuit company should consider in developing long- and short-term goals.

Product line, company strategy and the quality and productivity aspects of company culture are topics that will be covered.

The registration fee for the seminar is $295, according to an ICE spokesman.

More information is available from ICE, 15022 N. 75th St., Scottsdale, Ariz. 85260.

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CW 7/16

CALENDAR

WEEK OF SEPT. 16

SEPTEMBER 16-20, ARLINGTON, VA. — **Small Computer (R)evolution, Compcon Fall '84.** Contact: Small Computer (R)evolution, Compcon Fall '84, P.O. Box 639, Silver Spring, Md. 20901.

SEPTEMBER 17-19, NEW YORK — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 17-19, NEW YORK — **The Personal Computer: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 17-19, DENVER — **The Third Annual Data Storage '84 International Forum.** Contact: Forum Management, Cartlidge & Associates, Inc., Suite 205, 4030 Moorpark Ave., San Jose, Calif. 95117.

SEPTEMBER 17-19, DENVER — **EDP Disaster Recovery.** Contact: EDP Security, 181 West St., Waltham, Mass. 02154.

SEPTEMBER 17-19, NEW YORK — **Information Systems: Modeling, Analysis and Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 17-19, DENVER — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 17-19, DALLAS — **VM Systems Management.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 17-19, SAN FRANCISCO — **Office Automation: Strategic Planning, Design & Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 17-20, SAN FRANCISCO — **Structured Analysis and Systems Architecture Seminar.** Contact: Jane Crosswhite, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

SEPTEMBER 17-21, NEW YORK — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 17-21 in Washington, D.C.

SEPTEMBER 17-21, WASHINGTON, D.C. — **Structured Analysis for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 24-28 in Dallas.

SEPTEMBER 17-21, WASHINGTON, D.C. — **MVS Systems Management.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 17-21, CHICAGO — **Project Planning and Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 17-21, SUNNYVALE, CALIF. — **Software Development Performance Engineering.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 17-21, LONG BEACH, CALIF. — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 17-21 in Tampa, Fla.

SEPTEMBER 17-21, NEW YORK — **Structured Systems Analysis.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., 2800 N. Loop W., No. 405, Houston, Texas 77092.

SEPTEMBER 17-21, DALLAS — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N. Y. 10036. Also being held Sept. 17-21 in Philadelphia and San Francisco.

SEPTEMBER 18, ST. LOUIS — **Local-Area Networks.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

SEPTEMBER 18-19, PHILADELPHIA — **How to Use Dbase II on Your Personal Computer.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

SEPTEMBER 18-19, ST. LOUIS — **Quality Assurance.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

SEPTEMBER 18-20, WASHINGTON, D.C. — **The Seventh Annual Federal Computer Conference.** Contact: Federal Computer Conference, P.O. Box N, Wayland, Mass. 01778.

SEPTEMBER 18-20, PHILADELPHIA — **Microcomputer Database Management Systems.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 18-20, ATLANTA — **Structured Techniques Using Fourth-Generation Languages.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 18-20, BOSTON — **Decision Support Systems.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 18-20, BOSTON — **Computer Systems Auditing Seminar.** Contact: Bob Dunn, Honeywell Education Services, P.O. Box 8000, MS/T99, Phoenix, Ariz. 85066.

SEPTEMBER 18-21, WASHINGTON, D.C. — **Hands-On Unix Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

SEPTEMBER 19, BOSTON — **Mid-Term '84: Status of the IC Industry.** Contact: Seminar Coordinator, Integrated Circuit Engineering Corp., 15022 N. 75th St., Scottsdale, Ariz. 85260.

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EDITORIAL

That's show biz

Whatever else you care to say about it, one thing is certain: The National Computer Conference is a big show with big momentum. Last week's extravaganza in Las Vegas was no exception.

A vocal chorus in the computer industry complains every year that the show is too big. Too many exhibits. Too much to see. Too many people. And while we would agree, the American Federation of Information Processing Societies, Inc., the show's sponsor, says those are the very measures of NCC's success. Afips acknowledges complaints about the show's size, saying that NCC has "experienced enormous growth" since the biannual fall/spring joint conferences were consolidated in 1973. Some 26,000 attended NCC '74 in Chicago; this year, Afips expected to break all attendance records for international visitors and people traveling more than 200 miles, although the show sponsor refused to disclose preshow estimates or final figures. Approximately 100,000 people attended NCC last year in Anaheim, Calif.

Afips also quietly points out that those who complain about the size of the show now were the ones who, during the biannual conferences of the '50s, '60s and early '70s, were lobbying most strenuously for a single national show. "How quickly they forget," one Afips executive said.

Afips claims that NCC provides the most bang for the buck, delivering the maximum exposure for the greatest number of products to the most people — at the least cost. Such cross-pollination, Afips contends, only happens at large shows like NCC, not at smaller joint conferences as in the past. Clearly, a return to those joint sessions is not in the cards.

To many exhibitors on the floor last week, size was an accepted fact of life, a nonissue. Exhibitor enthusiasm was high. Exhibitor move-in was the smoothest in years. And there was good reason to believe the quality of floor traffic would be higher than ever simply because only those with a genuine interest in the industry and its products would trek to Las Vegas. In short, fewer tire kickers, more decision makers.

Well, is bigger really better? No, but maybe it's time to put the whole issue of size to rest. With 380,000 square feet of exhibit footage in the Las Vegas Convention Center filled to capacity and with some vendors turned away for lack of space, NCC may just be a victim of its own success. That's show biz.

That's bad biz

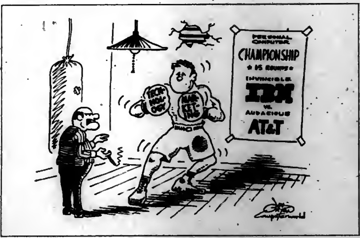
The American Federation of Information Processing Societies, Inc., sponsor of the National Computer Conference, has in recent years become increasingly secretive about the number of people who attend NCC each year. That, of course, is its option.

But must such policy also extend to not releasing locations of future conferences?

When asked last week where NCC '86 would be held, Afips Operations Manager Sam Lippman's official response was "No comment." Others within Afips say three locations are under consideration, though no decision has been made.

Exhibitors who support NCC and who need to make plans for future conferences deserve some sort of explanation, even if only an interim one.

"No comment" is no answer.



'And for God's sake, follow through with your left!'

LETTER

Take heart, liberal arts grads

"It's springtime, Mom! *Computerworld* printed some articles over which we liberal arts types can glow with pride — Richard P. Johns' 'Liberal arts grads form programmer pool' and 'Don't judge a programmer by expertise alone' [CW, May 28]. I used to feel like all that work making the grade didn't mean anything to anybody. Now I feel good."

"I'm so happy for you, son."

"Remember when I lucked out last year and the company needed systems programmers so badly that they offered me the training? I just got my review — and they like my work! My official title is now associate systems programmer."

"Oh? How wonderful!. What's a systems programmer?"

My English degree was useless in 1975: no teaching jobs, little experience. I wound up in a warehouse of low tech. Four years later, I was browsing books in a bookstore trying to find Christmas presents for mom and everyone else, when this strange title, *What Color is Your Parachute*, grabbed my wallet and purchased itself, despite my ill feelings toward career manuals. I tell you no lie, the technique really worked.

It wasn't exactly easy, but after six months of spare-time effort and two months of door knocking, street beating and network building, I made the break into software technical writing, with hardware sprinkled in for body.

Take heart, dear lovers of the liberal arts. Though the slings and arrows cut your guts to ribbons, maintain your pride. You can grasp any technology you need to learn, be it programming, electronics or any other discipline, for you have learned how to learn, how to listen, how to communicate and, above all, how to think.

Motivate yourself; please don't be the fool I was for four underpaid and stagnant years. You may find good counsel in the aforementioned book and in others it recommends.

Ray A. Kampa
Louisville, Colo.

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VIEWPOINT

'Tsunami' revisited

LECHT ON SCIENCE
Charles P. Lecht

Part one of a two-part series

In today's humble offering, I reveal what happened to a book I started and abruptly stopped after the first three chapters were published in *Computerworld* in late 1978/early 1979. Titled *Tsunami*, the Japanese cry for "tidal wave," it was intended to be a review of foreign computer industry events and a forecast of the effects these would have on the balance of technological power between the U.S. and the rest of the world in the 1980s.

Like my book *The Waves of Change*, *Tsunami* was to have been serialized in *Computerworld* (CW, July 9) in an on-the-fly writing orgy to keep its information as fresh as possible before delivery. It was assumed that intelligent readers would know that doing a book in this unconventional way would produce an unconventional result that valued, in its essence, interpretative analysis and insight more than factuality, ideas more than data. In view of the blizzard of change that was to fall on our computer industry, *Tsunami*'s goal of presenting the global picture betrays me as having been about as optimistic a dodo as was Don Quixote de la Mancha on his holy quest.

In rereading *Tsunami* today, over five years after its publication, I am pleased with what is there and amused by the way it is organized: First a chapter on the now unmentionable I/O standards debate which raged so long that, when it was ultimately adopted, everyone apparently forgot what the standard was; next a chapter on Japan, saying it was heroic in its technological ascendancy and would become No. 2 in world computer technology; finally a chapter on Germany as number three.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

A fascinating story was unfolding which revealed that our world computer industry would, for the first time, see technological self-sufficiency emerge in a few foreign-owned computer enterprises, especially in Japan. Until now, none above the mini class could make that claim, although they were not reluctant to do so, their governments' subsidies notwithstanding. And during those days, the revenues of the mini-to-micro marketplace were inconsequential in the scheme of things: 10% at most of total computer systems expenditures in developed countries and but a few percent, at best, of total industry profits. So it was no small event that a few foreign mainframe companies were soon to make it under their own power.

Effect on American computer industry

I thought of the effect this might have on our American computer industry; at least half of its profits had come from abroad for more than 10 years. As you might expect, I concluded that this might not be too good for our "home teams," thus far accustomed to winning most games "played away" or "at home" against foreign competition. I use the word "team" to drive home the idea that our indigenous computer industry was seen as a unified, cooperating group of companies — even secretly underwritten by Uncle Sam — by our major foreign competitors.

In 1978, our computer industry had provided a handsome $3.6 billion in international trade profits at a time when such profits were sorely needed. As if we weren't having enough troubles, what with oil crises, revolutionary hostages and inflation, our manufactured goods profit-producing champion, computer technology, was to undergo siege from true foreign competition. It's no wonder it became virtually un-American to suggest that this was happening — a cynical sage once proclaimed that it is unhealthy to find a dead body by yourself. As I wrote about the rise of foreign computer technology, especially in the land of the rising sun, I was appalled at the attacks my work was undergoing, and I took to the hinterlands, abandoning *Tsunami* like a hot ingot. I was following Bertrand Russell's advice that a hero might well be a person who hasn't examined all of the facts.

Let's take a closer look at *Tsunami*. In Chapter One, we are introduced to the famous Federal Information Processing I/O channel standard proposed for adoption by our government — the I/O channel interface on the IBM 360/370 as a required facility on hardware offerings if vendors hoped to sell these to the government. The chapter takes the position that adoption of that standard is a mistake; that it would do little more than aid foreign competition, notably from Japan; that it would inhibit hardware development in the U.S.; that less than 10% of our computer industry (by dollar volume) wanted it; and that notable among the group that didn't want it were our industry leaders: IBM, Sperry Corp., Burroughs Corp., NCR Corp, Control Data Corp., Digital Equipment Corp., Honeywell, Inc. and, as you may expect, Cray Research, Inc.

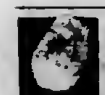
That IBM didn't want it should have been enough to impress anyone who was following its new developments, all of which involved improved versions of the channel interface. That the others didn't want it derived from their own, not dissimilar, motives. Additionally, the fact that all were required to support two channel interface facilities anyway, one to allow their customers to utilize I/O devices from previous systems offerings and one for whatever new they had to offer, caused them legitimately to fear increased systems prices by forcing them to manufacture the IBM I/O channel as well.

Since IBM's previous offerings were the proposed standard, it was faced with a peculiar dilemma, which appeared to me as follows: If the standard wasn't adopted, American competitors, who were disposed to going their own ways anyway, might create new facilities that would compel the purchase of their products and make it increasingly difficult for purchasers to open future systems procurements to competition. If the standard was adopted, foreign competition might be disposed to replace IBM computers on their own soil, at least, if not in the U.S. as well.

With the largest of American manufacturers (save IBM) burdened with the additional costs of

See REVISIT page 48

Need execs sully their hands at workstations?



HUMAN CONNECTION
Jack Stone

Glitzy technologies are not the only rabid interests of the DP clan. We also while away many hours waiting for system output in hot debate over issues that should have been buried years earlier, like the perennial question: "Should executives sully their hands and weary their eyes at a computer workstation?"

It is not possible to bring the subject to a conclusive end in this column, much as I would like to. But I will attempt to move the issue along, that is, toward how the workstation can be used rather than why. I've even brought on board a secret weapon to back me up, a big gun of a computer management consultant whose long-term experience supports my views.

To me, the answer is an obvious "yes" and has been since I was first introduced to time-sharing nearly two decades ago. Now, I must point out that the reasons for encouraging company leaders to access terminals have changed over the years as system capabilities have increased and performance improved.

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Early on, "hands-on" was justified on the basis of literacy, where the individuals could quickly gain an appreciation of what computers did and, just as important, what terminal users — operators, programmers, systems managers — did for a living. After all, computer centers in those salad days (and now more than ever) were cutting out a relatively large hunk of the corporate resource pie, and it wasn't untoward for the top people to have some sort of idea of what they were getting for their money.

Literacy is still a matter of concern in some quarters, but is rapidly giving way to considerations of personal productivity, what with the undeniable success of personal systems, such as workstation access to micro, mini or mainframe equipment.

Steve Epner, a well-known St. Louis-based independent computer consultant, has strong views on the subject. "We are rapidly approaching the era when busy executives everywhere must and should be thinking about acquiring personal computers or terminals, particularly if the machines provide easy, low-cost methods for saving time and/or avoiding tedious tasks. For example, those on the run surely must be looking closely at simple notebook-style machines to allow them to type in short notes and reports for immediate transmission via phone lines to a host machine at the home office. And the notion of using an in-transit hookup from a train or plane is no longer a myth.

"As another illustration, spreadsheet facilities are a must in the hands of the executive. The insight gained by varying input parameters and watching projections — those fundamental to the business — change over a period of years and should not be a delegated task. Further, the availability of reliable spreadsheet software, plus its ease-of-use and remarkably low cost, make it a natural for top managers.

"As a matter of fact, my interests in the workstations, and those of others, have expanded into studying alternate designs for executive-oriented systems, since the array of options available has created many fascinating possibilities. As an illustration, one consideration is the choice of the integrated package of applications [combined spreadsheet, word processing, data processing, graphics] vs. separate applications. Although such packages eliminate the need for learning individual sets of commands, there is, in certain situations, some sacrifice in performance. On the other hand, with the separate applications, we often face problems of incompatible data files. Another variable is the use of the mouse to simplify the execution of commands or cursor control keys to speed the process.

"Can today's terminal systems satisfy significant information handling needs of executives? The answer is a resounding 'yes,' but with the same caveat given with the acquisition of any system: They must be justified on the merits of particular programs and their utility for the users."

VIEWPOINT

Evaluating software vendors

READER'S PLATFORM
Naomi Karten

Are vendors of fourth-generation mainframe software able to meet their customers' demands for support? How can you find out before you commit to a product you will be living with for a long time?

Vendor responsiveness is included in most information center checklists for evaluating end-user software. Usually, however, this criterion is low on the list. All too frequently, software selection teams give this qualification only cursory attention. And rarely is the vendor's ability to meet the inevitable demands for technical support — by both user, DP and information center staff — put to the test before the software is acquired.

A few years ago, the extent of a fourth-generation software vendor's after-sale presence was of limited concern to DP departments. End-user computing was new. Application development tools were just emerging. Fourth-generation software packages were far simpler, both technically and functionally, than today's software.

Different story

Now the story is different. With the success of the information center concept and growing user demands for easy access to computerized information, fourth-generation products have flourished. At the same time, they have become much more comprehensive. Graphics, statistical analysis and mainframe-to-micro data transfer, for instance, are common components of many such products.

You will almost certainly need more vendor support than anticipated — for installation, for design of initial data bases and applications, for training, for a million technical questions you won't realize you have until the product is in use. When this happens, you won't care about the vendor's problems; you will only want its attention.

Fortunately, it is not difficult to assess a vendor before you sign away a major chunk of your software budget.

First of all, expect the vendor's marketing presentation and product brochures to be slick. It is rare to attend a product overview seminar in which the product — and the organization selling it — come across as anything less than terrific. In fact, a sloppy marketing pitch would be the first clue to stay away from the product.

When you've evaluated enough products to whittle your list down to three or four candidates, ask the vendor some questions:

- How long will installation take? Will the vendor be available during the installation? Claims of half-hour installations are likely to be moderated if the vendor expects to have to be present for it.
- Will the vendor assist in the design of your pilot data base and application? Be spe-

See VENDOR page 48

Karten, a former information center manager, is a management consultant based in Woodland, Mass., specializing in the management of end-user computing.

At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

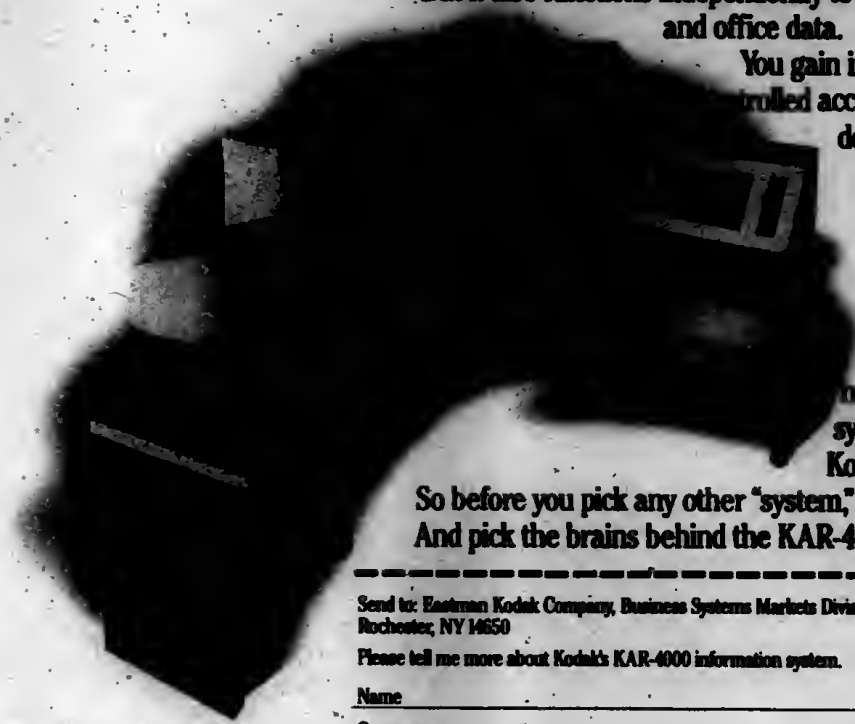
Introducing the Kodak KAR-4000 information system. Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

The result: a Kodak KAR-4000 information system. It outperforms any other computer-assisted retrieval system. But it also functions independently to process both documents and office data.

You gain independent computer-controlled access to on-line data and documents. Without the staggering expense of on-line computer storage.

You even gain independence from service—all components in the KAR-4000 system are serviced by Kodak.

So before you pick any other "system," send in the coupon. And pick the brains behind the KAR-4000 information system.



The Kodak KAR-4000 information system. It gives the computer a photographic memory.

Kodak

Send to: Eastman Kodak Company, Business Systems Markets Division, Dept. DP4566
Rochester, NY 14650

Please tell me more about Kodak's KAR-4000 information system.

Name _____

Company _____

Address _____

City _____

State _____ ZIP _____

Please answer the following:

1. How many incoming documents per day do you process? ☐ 1000-2000 ☐ 2000-5000 ☐ Over 5000
2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

VENDOR from page 46

cific. Ask if the vendor will commit to being on-site for a two-week period after installation. Regardless of whether you will actually need such start-up support, the vendor's response may signal the extent to which the vendor is committed to the success of its product in your installation.

■ Find out if the vendor has a hot line for technical support. Does it have an 800 number? A hot line without a toll-free number could be indicative of a vendor that is not interested in hearing your problems. The expense of repeated long-distance calls may be a deterrent for your company to seek adequate support.

■ What kind of telephone support can you expect? Every question answered in 30 minutes? Sixty minutes? Twenty-four hours? Is technical support available during evening hours? During the weekend? If the vendor is on the West Coast, and you are on the East Coast with a problem at 8 a.m., will you be able to get help?

■ How quickly can the vendor get to your site? Is the vendor willing to send a technical heavy hitter to you on short notice in an emergency? A vendor one hour away by shuttle might as well be on the other side of the world when traffic and weather conditions don't cooperate.

■ Next, do some checking on your own. Choose a couple of questions with obvious answers — such as, does the product offer graphics? — and a few questions with answers requiring technical knowledge of the product and some data base smarts. Call the technical support department at various times and ask these questions.

■ Call the marketing representative servicing your region. Chances are he will be out seeing customers. Leave a message, and see how long it takes for the call to be returned. When you make contact with the rep, ask for some product literature to be sent to you. See how long it takes to arrive.

■ Get the names of companies where the product is in use. You can start with a list of references from the vendor. Assume, however, that these will be companies the vendor *wants* you to know about.

■ Ask each reference for the names of other companies using the product. Contact the local or national users group, if there is one. Even better, try to attend a users group meeting.

■ You may also want to ask about training. Many vendors stress the importance of training for efficient and effective use of the product. Ask the vendor how far in advance you must schedule on-site training. If the answer is eight or 10 weeks, will this fit your training plans?

■ Ask references about the quality of this training. Find out if the vendor is willing to customize training to your organization's unique needs. Again, the vendor's response may be useful to you in gauging its interest in serving you, even if you intend to choose from among other training options.

Vendors, of course, have problems just like everyone else. For many, the success of their products has exceeded even their most optimistic expectations, and they are experiencing growing pains. Some vendor support managers comment freely about their concerns in keeping up with customer demands for support. Other vendors are happy to collect monthly license fees and consider training, consulting and technical support a tedious, but necessary, cost of doing business.

Information center and DP staff need to determine the importance of vendor qualifications in an overall evaluation. Regardless of the relative importance of these criteria, knowing what you can expect from a vendor will contribute to effective planning of the best possible level of support for your users. ‡

REVISIT from page 45

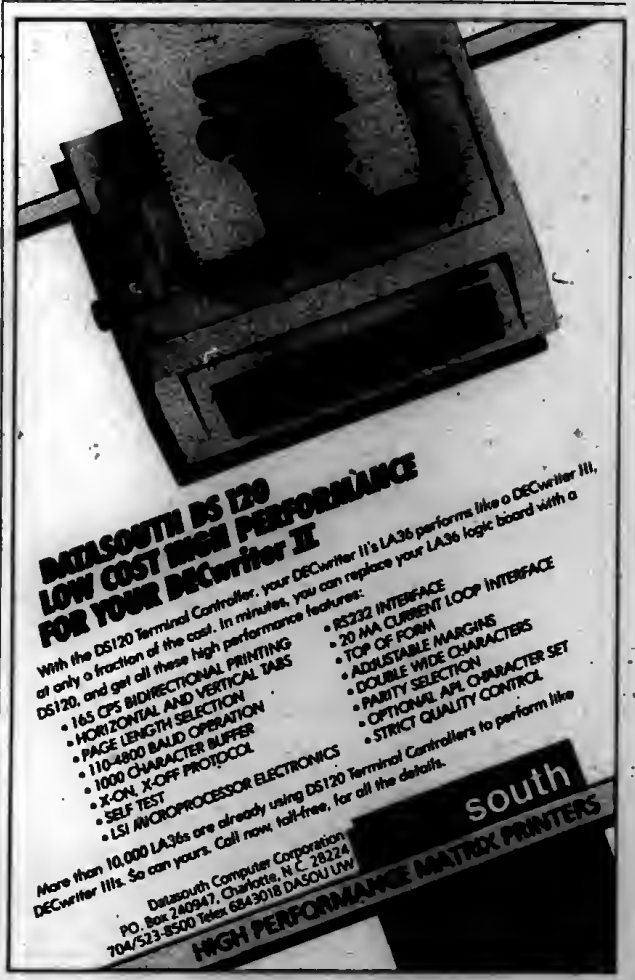
maintaining the soon-to-be-obsolete channel interface on their systems, this rise in foreign competition would be accelerated. Disposed to going IBM's way in the first place — riding on its popularity by producing look-alikes — Fujitsu Ltd., Hitachi Ltd., Seimens AG, ICL, Inc. and others have found the road to big revenue dollars this way.

When IBM chose to fight the standard, it considered competition from foreign companies more a threat than from the home team. History has shown that its decision was the correct one, for in 1980, Fujitsu, already profitable for several years, wrested marketplace share leadership from IBM Japan, an event that was unprecedented in developed countries in our industry; Fujitsu did it by selling IBM-compatible hardware that sported IBM's I/O interface channel.

I started *Tsunami* with a defense of the anti-standard position taken by the Computer and Business Equipment Manufacturers Association, under whose banner 90% of our industry gathered. I did this because I believed its opposition to the proposed standard to be well-founded, although I did not always agree with the methods some of its membership employed to thwart the standard.

Anyway, all the hullabaloo about the standard was, in my view, needless; for by the time our government's standards watchdogs began to bark, it had achieved at least de facto status. Now it was time to move on.

The next two chapters of *Tsunami* covered Japan and Germany, in that order. Each presented a picture of a country that had risen from the ashes of World War II to achieve self-sufficiency in the act of producing a modern computer system. However, *Tsunami* never suggested that either could build enough to fulfill their own domestic needs for a long time to come.



SOFTWARE & SERVICES

SOFTLINE
William Inmon

Does user-friendly mean user happy?

User friendliness is easily the most obvious and important trend in data processing in recent years. Its thrust is in two directions — in the development of systems and in the usage of systems. But is user friendliness all there is to user satisfaction? The answer to that question is best addressed in terms of the context of different environments, in particular the on-line, operational environment (as opposed to the decision support environment).

The cost-effective use of workers' time in the on-line, operational environment is unquestioned. What, then, are the parameters of user satisfaction in that environment?

Two parameters are of the utmost importance:

- Consistent, satisfactory on-line response time.
- Consistent, satisfactory on-line availability.

On-line response time is the amount of time required for the system to provide output for an on-line request. On-line availability refers to the amount of time the on-line system is up and available for usage.

When these factors are met, the user then thinks about such things as ease of use, quality of system prompts, value of error messages and so forth. But if response time and availability are not satisfactory, then typical user-friendly factors become secondary.

But if the system is even moderately friendly, performs well and is available at appropriate times, then the system can be successful.

Another way of illustrating this point is to consider the on-line, operational system development life cycle. User-friendly development systems can streamline the first phases of a project. This enhancement of the speed and costs of initial development unquestionably pleases the user, so it is argued that user-friendly systems do in fact enhance user satisfaction. But what happens when the system begins to mature?

As the system matures and goes from design into implementation, the user then wants performance and availability. In running against a small amount of data or with a small amount of activity, user-friendly software usually does not demonstrate any major problems. But when put into execution in a normal, active on-line environment, user-friendly systems often display distressing problems of performance and, in some cases, of availability.

To protect the on-line environment, user-friendly software is either not run at all, or user-friendly features are greatly inhibited. This defeats much of the

See FRIENDLY page 61

Inmon is a director at Coopers & Lybrand in Denver, a noted author on the subject of data base design and a regular contributor to Softline.

DG offers DG/UX, TCP/IP, Quickplan for its MV/4000s

NEW YORK — Data General Corp. has unveiled a series of software enhancements for its MV/4000-based systems.

At a press conference here, the firm introduced DG/UX, a native-mode implementation of the University of California at Berkeley's Version 4.1 of the Unix operating system. DG/UX will operate on DG's MV/4000 or its newly announced Distributed Systems (DS) single-user engineering workstations, which are based on the MV/4000 CPU.

DG/UX is a virtual-memory operating system capable of supporting demand paging. Users have the option of selecting the Berkeley Software Distribution (BSD) C-shell user interface or the AT&T Bourne shell. In addition, DG/UX offers compatibility with Unix System V Release 2 and selected features from the Berkeley Version 4.2, such as a faster file system and networking support, DG said.

DG/UX is the second version of Unix supported by DG. Last year, the firm announced MV/UX, a hosted version of Unix that can be integrated into DG's AOS/VS operating system. DG/UX is the first native or stand-alone version of the operating system supported by DG, a spokeswoman said.

DG/UX costs $1,500 for a stand-alone license. An eight-user license costs $3,500, and a 16-user license costs $6,000. A 32-user license costs $8,500.

In addition, DG announced support for the Transmission Control Protocol/Internet Protocol (TCP/IP), a BSD Version 4.2 standard communications protocol for Xerox Corp.'s Ethernet local-area network. This, DG said, provides communications capabilities among DG/UX systems and other DG systems as well as non-DG systems.

Furthermore, the native Unix operating system is said to support Unix-to-Unix

See DG page 61

Information Builders offers 'Foctalk'

NEW YORK — Information Builders, Inc. has announced three versions of PC/Focus, its fourth-generation query language, and Foctalk, which allows users to construct Focus queries on an IBM Personal Computer, extract data residing on a mainframe and transfer that data to the microcomputer.

Foctalk, designed for an IBM Personal Computer running IBM's PC-DOS 2.0, consists of four segments: Link, Tabletalk, Filetalk and Ted.

Link, a communications facility, reportedly provides bidirectional transfer between an IBM Personal Computer and a mainframe Focus package via Digital Communications Associates, Inc.'s Irma board.

Tabletalk, a menu-driven report generator, formats reports that are sent to and executed at the mainframe, Information Builders said. A JOIN command is said to relate logically files structured with one or more common keys.

Filetalk allows for the automatic creation of simple master file descriptions, the vendor said. The facility reportedly prompts the user for file name, field names and format options before it creates master file descriptions.

Ted, a full screen editor, provides a complete selection of editing functions that can be initiated by a function key, according to the vendor. The facility reportedly can create or edit any sequential file or source program.

Foctalk costs $450 and requires mainframe Focus Report Writer.

New versions of PC/Focus, priced at $1,595/copy, were designed for IBM's 3270 Personal Computer, Texas Instruments, Inc.'s Professional Computer and Wang Laboratories, Inc.'s Professional Computer.

More information is available from Information Builders, which is located at 1250 Broadway, New York, N.Y. 10001.

Lisp: The resurgence of a language

SOFTALK
Paul Gillin
CW Senior Editor

Lisp is staging a comeback.

The granddaddy of artificial intelligence languages has been the subject of a number of announcements recently. Digital Equipment Corp. just announced Lisp availability on its VAX-11 series of superminicomputers [CW, June 18]. Apollo Computer, Inc. now offers Lisp on its Domain series of workstations [CW, May 28]. Lisp Machine, Inc. recently announced two new Lisp-based machines in as many months [CW, April 13; June 4]. And Perq Systems Corp. recently unveiled a microcoded version of Common Lisp on a new workstation [CW, May 21].

This does not mean you should sign up your entire programming staff for Lisp courses. But it indicates that Lisp is attracting a great deal more attention. A recent study by Brattle Research Corp. predicted that the market for Lisp machines and artificial intelligence applications will top $1 billion by 1988 [CW, April 16].

In many ways, Lisp is an enigmatic language. Developed before Cobol (1958), it has long been a favorite of AI researchers, but has seen very limited commercial application until recently. A major reason is that it is a very resource-consumptive language. In contrast to Cobol, which was originally written for machines with 16K bytes of main memory, Lisp was developed as an elegant language for logical research rather than as a practical programming language. Its

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INSIDE

Fourth-generation tools promote end-user involvement

By David Cantral
Special to CW‡

The increased user involvement in application development introduces both problems and advantages to a corporate DP department. Users are able to apply their own knowledge and creativity to solving business computing problems, bypassing the communication gap between themselves and programmers. However, off-the-shelf, packaged tools do not always meet specialized needs or unique requirements.

Also, equipping end users with a diverse array of software for wide-ranging tasks means sacrificing well-planned, broad-based support and control that only a centralized DP department, supporting a single software system, can provide.

The answer to a structured yet end-user-oriented DP environment is to incorporate a fourth-generation language capable of flexibly controlling and supporting end-user participation in application development and modification.

Access to application development or modification capabilities is controlled in two ways: The first method involves packaging of the language; the second involves development of the applications under the language.

A complete application development capability is provided through the full-feature version of the language. In this form, complete access to all features of the language is provided either solely to the DP department or on a per-case basis to end-users with complicated applications that they know best — inventory, order entry and so forth.

Very strict control of end-user application development activities is achieved through use of a limited runtime version of the language. This enables users to run applications without change at speeds approaching those of hard-coded applications. The resulting system provides significant cost benefits, since it is not necessary to purchase a full-feature system for each user.

Finally, the DP department can develop applications with the language in a manner that allows any desired degree of control to be imposed on end-user application development and modification capabilities. This is done by developing the applications in two modules. One is locked and cannot be changed by the end user. The other is unlocked and provided to the user under the full-feature language. Users can then modify some aspects of the application, but not others, all under the control of the DP department.

In order for a DP department to provide optimum levels of support for diverse users on a broad array of computers, a fourth-generation language must satisfy a number of design criteria.

One of the most critical elements of the language is that it must be transportable across a wide range of computers. Additionally, the applications developed under the language must be able to run on each of those computers without change. This enables the support staff to implement a single set of support procedures, regardless of the type of user or the specific computer.

To be truly transportable, a system must be capable of efficiently using as few as 128K bytes of memory, suiting it to operation on microcomputers. This requires an architecture that swaps into main memory only those variables, math routines and formats that are needed for the routine being performed. This virtual-memory-based design contrasts with traditional architectures that keep all numeric and alphabetic variables resident in memory and monopolize 256K bytes of memory.

Another important design element is that the language must utilize an English-based command structure. Additionally, the language should feature menus and programming prompts to aid the user in understanding the application development task. These menus and screen prompts walk the user through any type of application development procedure.

The language should also be capable of utilizing built-in, problem-solving facilities. In the same way that passwords are used to protect locked portions of applications from unauthorized user access, passwords can provide a method for supporting users who experience application problems. The DP department simply builds specialized recovery routines into a locked application module. The routines are activated only by the software developer in the event of a user software problem.

It is also critical that an organization not be forced to rely on the original developer for long-term support of each application. Instead, each application should generate self-documentation from the running program, ensuring that the source is never lost. TI is eliminates problems related to programmer turnover.

In addition, the application should be easy to modify as business requirements change. This is possible only if the language compiles interactively rather than in a batch mode. As modifications are made, only the section being changed should require recompilation.

Cantral is vice-president of research and development for Pyramid Data Ltd., an Orange, Calif.-based developer of software products based on fourth-generation languages.

Pansophic to market micro-mainframe link from Micro Tempus

OAK BROOK, Ill. — Pansophic Systems, Inc. has signed a royalty agreement with Micro Tempus, Inc. of Montreal under which Pansophic will market Micro Tempus' Tempus-Link micro-computer-to-mainframe communications software under the name Panlink.

Panlink will be offered initially as a communications tool between Pansophic's Easytrieve-Plus query and reporting language and the IBM Personal Computer.

The product is functionally identical to Tempus-Link, which allows Personal Computer users to communicate to the mainframe and to each other by use of "virtual disks" on the mainframe.

File transfer can be initiated at the mainframe and micro levels. Data can be extracted and written on virtual disks by a data base extract program.

It can then be downloaded in real time to the Personal Computer. Files residing on the virtual disks can be made available to all Panlink users. The product is independent of the mainframe data base management system and teleprocessing monitor.

A Pansophic spokesman said the company will add further features to Panlink to customize it to Pansophic products, probably within the next year.

Pricing is structured according to maximum concurrent users (MCU), which dictates how many users can access Panlink at the same time.

A base license for IBM's DOS operating system costs $6,500 with a five-user-MCU. For IBM's OS, the price is $9,000 with a five-user MCU. Additional MCU licenses can be purchased.

Pansophic is located at 709 Enterprise Drive, Oak Brook, Ill. 60521.

Firm beefs up its UFO package

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp.'s User Files On-line (UFO) has been enhanced to include an on-line interactive debugging aid, field-level editing capabilities and more efficient resource utilization, the company announced.

UFO Release 2.5 operates in the IBM CICS and IMS/DC environments.

Release 2.5's IOX access method reportedly was completely rewritten to offer multithreaded I/O to increase overall throughput. IOX is UFO's own access method for providing facilities similar to IBM's Vsam, according to a spokesman for the company.

Release 2.5's interactive debugging feature, according to the company, reportedly provides on-line, real-time tracing and testing and verifying of a UFO program's procedure logic.

The debugger identifies logic problems and unexecutable segments of code and determines why fields contain unexpected values, the spokesman said.

The software's field-level editing capacity reportedly provides automatic data validation to check the data entered in a field against a set of edit criteria specified by the programmer on a single screen.

UFO associates the edit criteria with the entries defined for the field in the UFO data dictionary and checks inputs against the criteria each time someone attempts to add or update data in one of those fields, the spokesman said.

UFO Release 2.5 operates on the IBM 370, 4300 and 3000 series mainframes.

It is priced, on a perpetual license basis, at $27,000 for a DOS version (CICS), $38,000 for an OS version (CICS) and $60,000 for a version under OS with IMS, the spokesman said.

Oxford is located at 174 Boulevard, Hasbrouck Heights, N.J. 07604.

CA-Eztest Release 2.0 now supports MVS/XA 31-bit architecture

JERICHO, N.Y. — Computer Associates International, Inc. has announced that Release 2.0 of CA-Estest, its IBM CICS Cobol debugging package, now fully supports IBM's MVS/XA 31-bit extended architecture.

The enhanced version allows XA users to test and debug programs utilizing 31-bit addressing and to display and update storage above the 16M-byte line.

Cobol storage

The new release also includes a new Cobol storage facility that displays Working Storage and Linkage sections as if they were contiguous as they are viewed in the Cobol source program.

An IBM DL/1 Service facility provides access to IBM IMS/VS and DOS/DL/1 data bases, a spokesman said. A CICS/VS data base can be browsed and updated with any standard DL/1 call parameter.

All CA-Estest/CICS options can now be maintained on-line by each operator. In addition, all system generation options and security settings for individual operators can be maintained on-line. A variety of other command, screen, dialogue and non-terminal-related task debugging improvements are included.

Batch facilities of CA-Estest/CICS have also been enhanced. All Estest files can be defined, backed up, restored, expanded or printed with a single command. Users can print copies of the on-line help file and command logs, the vendor said.

The software is priced at $21,000 for MVS and VS1 sites and $13,000 for DOS/VSE sites.

Computer Associates International is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

SYSTEMS SOFTWARE

MIDCOM CORP.
Cardware

Midcom Corp. has introduced Cardware, a software program that reportedly enables Digital Equipment Corp. minicomputers to run most popular microcomputer software, including Lotus Development Corp.'s 1-2-3.

Cardware reportedly offers such computers compatibility with Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems.

Developed by Logicraft, Inc., the Cardware software is also said to enable microcomputer users to replace their smaller systems with the higher quality drives of DEC minicomputer systems and still use their microcomputer software.

Cardware can reportedly specify up to six storage devices, virtual DEC files or floppy disk drives for personal computer operations.

Cardware's price range varies from $1,995 for systems with one user, to $5,993 for systems with three users, to $13,795 for systems with 1M byte of random-access memory.

Midcom, Suite 117, 1940 N. Tustin, Orange, Calif. 92665.

NETWORK APPLICATIONS, INC.
Transware

Network Applications, Inc. has introduced Transware, which reportedly allows users to shop for and buy personal computer software via their firms' IBM mainframes.

Transware runs on the IBM 370 and compatible mainframes under IBM's MVS operating system. It can be accessed via asynchronous communications. Programs can be purchased and downloaded to users from the 370 to the IBM Personal Computer, Personal Computer XT and compatible machines.

Transware reportedly records the sale to each user of each software package bought over the system. At the end of the month, the user's firm is billed at the pre-

Continued on page 86

Continued from page 53

vailing price for the software purchased.

Transware is priced starting at $10,000 for a mainframe license.

Network Applications, Suite 615, United Bank Tower, 400 W. 15th St., Austin, Texas 78701.

STRATEGIC INFORMATION
Archiver Version 1.6

Strategic Information's Computer Services Group has announced Version 1.6 of its Archiver disk-to-tape archive and retrieval package for Digital Equipment Corp. VAX-11 superminicomputers under DEC's VMS operating system.

Version 1.6 reportedly features user and system manager flexibility in reducing disk storage and associated costs. It is said to maintain an on-line directory of files archived for each user and to allow files to be retrieved or deleted from archival storage.

The version supports VMS wild-carding and will recreate an entire dictionary structure when necessary, according to the vendor. It is also said to give system managers the capability to transport archived files by tape from one VAX/VMS system to another.

The one-time license fees are $5,000 for the VAX-11/780 and VAX-11/782, $3,500 for the VAX-11/750 and $1,500 for the VAX-11/730. The product is available immediately.

Strategic Information, 80 Blanchard Road, Burlington, Mass. 01803.

DUQUESNE SYSTEMS, INC.
Quick-Fetch CICS option

Duquesne Systems, Inc. has announced the addition of an IBM CICS option to its Quick-Fetch performance enhancement software.

Quick-Fetch is a performance enhancement tool that improves response time and relieves virtual storage constraints of IBM's MVS and CICS systems. The added option can intercept CICS program load requests and maintain frequently referenced CICS programs in the Quick-Fetch private storage area. The option is said to relieve program loading from the CICS address space.

Quick-Fetch is priced at $9,800, with multiple-CPU and multisite discounts available. The CICS option to Quick-Fetch costs $4,000.

Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

BUSINESS COMPUTER DESIGN, INC.
Docu-Mint

Business Computer Design, Inc. has announced the release of its Docu-Mint package for use on the IBM System/36.

Docu-Mint automates the process of creating and updating software system documentation and gives programmers a variety of software tools and programming aids. It includes 20 modules that automatically document programs, procedures, files, fields, job flows, menus, screens and printer spacing charts. The one-time license fee for Docu-Mint is $850.

Business Computer Design, Suite 280, 900 Jorie Blvd., Oak Brook, Ill. 60521.

SYSTEM PERFORMANCE HOUSE, INC.
Single-Disk Dopter; Super Dyaqel

System Performance House, Inc. has announced its Single-Disk Dopter for Digital Equipment Corp. PDP-11

Continued on page 56

UNIX* POWER FOR DOS/VSE

WITH PWS/VSE – an interactive time-sharing system that couples the power of a UNIX programming environment with your DOS/VSE system.

PSW/VSE provides:

- Extremely powerful full-screen text editor for 3270 CRT's
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- Local and Remote Terminal support
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- VM Interface
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- Online Sort
- Spooler file access
- IBM Library interfaces
- Personal Computer Link
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Find out how to become a Super-User with PWS/VSE. Improve your programming productivity and gain the power of a UNIX compatible system on your IBM mainframe–TODAY. Call us toll free at 1-800-446-9900. (In Virginia, 804-276-9200.)

*UNIX is a trademark of Bell Laboratories.

Yes, please tell me how to become a Super-User with PWS/VSE!

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____

CPU _____ Op.Syst. _____

NIXDORF COMPUTER

Nixdorf Computer Software Company, 6517 Everglades Drive, Richmond, VA 23225

SOFTWARE & SERVICES

Continued from page 54

systems running DEC's RSTS/E operating system.

Single-Disk Dopter is a disk structuring program said to require no mass storage device other than the one being restructured. When combined with the firm's UFD Optimizer, the product can bring about performance gains of 50%, the vendor said.

The product is priced at $450 for a single license, the vendor said.

The company also announced the Super Dynpri performance tool for the PDP-11 with RSTS/E. Super Dynpri is said to provide increased throughput on systems that contain a mix of applications. Features include the ability to give top priority to interactive jobs in which the user frequently types responses, to give second highest priority to jobs that perform frequent disk I/O and to give lowest priority to CPU-intensive jobs, the company said.

Super Dynpri is priced at $350 for a single license.

System Performance House, 5522 Loch Moro Court, Dublin, Ohio 43017.

CAMBRIDGE SYSTEMS GROUP, INC.
ADC2, ACF2 price increases

Cambridge Systems Group, Inc. has announced price increases for its Automated Data Center System (ADC2) and for the MVS version of Access Control Facility (ACF2) software that it markets.

ACF2 was developed by SKK, Inc. of Rosemont, Ill.

Effective Aug. 15, small system license fees for ADC2 will rise to $35,000 from $32,000, and the standard license fee for ADC2 will increase to $49,000 from $42,000.

Effective Sept. 15, the license fee for the ACF MVS version will increase to $33,000 from $29,700, the vendor said.

Cambridge Systems Group, 24275 Elise, Los Altos Hills, Calif. 94022.

PRODUCTIVITY AIDS

STSC, INC.
APL*Plus/UNX

STSC, Inc.'s Software Publishing Group has announced the APL*Plus/UNX system, which the company said is an enhanced APL interpreter and application development system for the Unix operating system.

Continued on page 61

LISP
from page 49

real power is only apparent on hardware with several M-bytes of memory and a large address space, the kind of power that has only become available in recent years.

In fact, Henry Baker, who is founder and director of business development at Symbolics, Inc., a Chatsworth, Calif., vendor of Lisp workstations, remembers chewing up most of the resources of a Digital Equipment Corp. PDP-10 computer with a single Lisp application as recently as 1977.

Another reason for Lisp's limited success has been the lack of high-quality implementations, according to Jerrold Kaplan, chief development officer at Teknowledge, Inc., a Lisp workstation vendor in Palo Alto, Calif. However, Lisp has been constantly evolving throughout its 26-year history, so much so that Kaplan said new versions of the language are every bit as good as PL/I, Fortran or Cobol.

Third major reason

A third major reason for Lisp's obscurity has been the lack of practical business applications that use AI. "The traditional function of DP has been to replace clerical, repetitive tasks," Kaplan explained. "Now it's taking on symbolic reasoning tasks."

The most popular new Lisp applications involve simplifying the interface between user and machine. For example, one system developed jointly by the U.S. Navy Personnel Research and Development Center in San Diego and by Bolt Beranek & Newman, Inc. of Cambridge, Mass., teaches non-computer-oriented naval personnel to run a steam plant on a large ship.

Intellect, a well-known natural query language from Artificial Intelligence Corp. of Waltham, Mass., was originally written in Lisp and later rewritten in PL/I. The language is emerging as a viable tool for computer-assisted design and manufacturing applications and may soon find a home in decision support.

Bright future

Experts generally agree that Lisp has a bright future. For one thing, there are few alternatives to Lisp in the burgeoning AI field. In addition, Lisp is well suited to the new nonprocedural development methodologies that are gaining popularity. Because Lisp is an interpretive language, it can be used to develop software iteratively, requiring compilation only of individual functions rather than the whole system. "When you develop in Lisp you tend not to know what you want to wind up with," Baker said. "You may go through several iterations, adding functionality as you go along."

But do not expect Lisp to replace the traditional DP-oriented languages. For one thing, its uses are quite different from the repetitive orientation of most languages. For another, its procedures are dissimilar. "People with an extensive background in something like Fortran or PL/I actually have a harder time using Lisp than those with no background at all," Kaplan said.

Lisp has also been criticized for being difficult to learn and cryptic to read.

However, Kaplan dismissed those complaints. "It's not harder to learn, but it's a different skill."

DIGITAL'S MICROVAX I. THE BEST ENGINEERED 32-BIT MICROCOMPUTER IN THE WORLD.

Several years ago, Digital's engineers set out to revolutionize computer performance by extending virtual address space to unprecedented proportions.

They succeeded with VAX™ architecture. A design strategy so successful, it completely revised what the world expected from 32-bit computers.

Those same engineers have been at it again. This time, compacting VAX architecture into the MicroVAX I™ system.

A micro by every measure, the MicroVAX I system nevertheless delivers all the versatility and speed you've come to expect from its larger namesakes. It guarantees both hardware and software compatibility with other VAX computer family members. It lays claim to the same treasure chest of development tools, utilities and languages. It provides access to the same impressive library of proven applications.

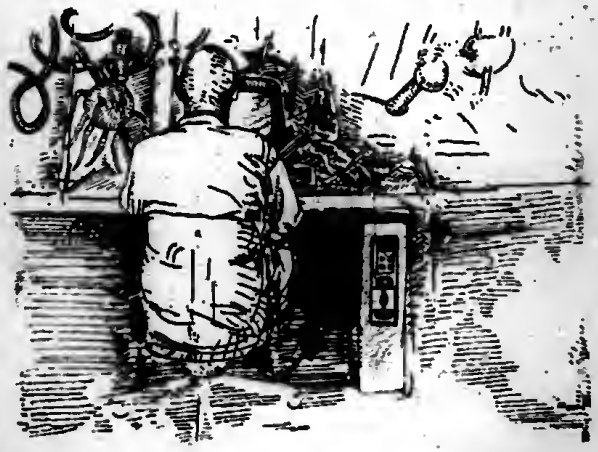
With the MicroVAX I system, the industry's premier 32-bit architecture has been miniaturized by VLSI technology. Along the way, Digital's engineers dramatically reduced something else: the cost.

Entry into the celebrated VAX computing family is now possible for as little as $10,000.

THE UNCOMMON BENEFITS OF VAX ARCHITECTURE.

A genuine VAX computer, the MicroVAX I system has been, in a sense, already proven at tens of thousands of VAX installations.

Its high bit-efficiency, for example, is achieved in true VAX architectural fashion—by accommodating data types ranging from one to 128 bits, and 21 distinct addressing modes. You can select precisely what your programs call for. The system boasts over four gigabytes of address space, made possible by full virtual memory management.



The MicroVAX I system also inherits the elegant VAX instruction set. Some three hundred separate instructions. This gives developers exquisite control over the micro, and in turn, gives the system extraordinary applications flexibility.

Bit efficiency for speed, elegant instructions for flexibility, and consequent growth potential are the heart of VAX architectural excellence. They free MicroVAX I system users from memory overlays, program segmentation and other encumbrances of competitive 16- and 32-bit micros. VAX system sophistication means compact compilers and operating systems. It means applications that execute with speed.

The MicroVAX I computer enters the marketplace prepared both to live up to the legendary status of its predecessors, and to make a name for itself.

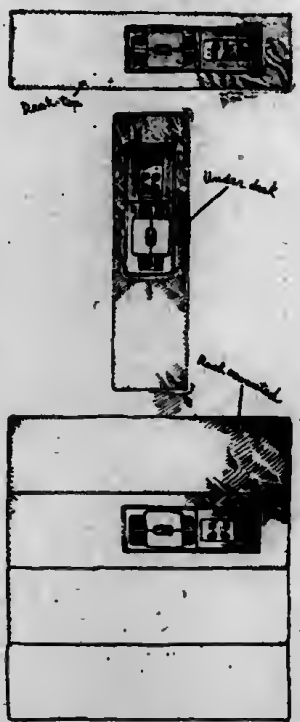
HARDWARE ENGINEERED TO GIVE YOU BIG SYSTEM PERFORMANCE.

To be sure, the MicroVAX I computer is a true micro. It fits under the desk, on the desk, or most compactly of all, taking up just 5¼" of height in a 19" rack.

The MicroVAX I system delivers over 35% of the raw power of Digital's VAX-11/780 computer. Enough to satisfy your most demanding supermicro applications. Enough to comfortably support up to five users.

There is big system capacity: one-half million bytes of physical memory is standard, and expandable to four megabytes. For highly technical applications, MicroVAX I systems also come standard with support for both single and double precision floating point arithmetic.

To enhance the already impressive execution speed, Digital's engineers even put in



an eight-thousand byte direct-mapped cache memory.

SYSTEM SOFTWARE ENGINEERED TO GIVE YOU UNMATCHED VERSATILITY.

While ordinary micros give you just one, often thinly supported operating environment, the MicroVAX I system gives you a choice.

There is the MicroVMS™ operating system, Digital's famous VMS™ general-purpose system repackaged for the MicroVAX I computer. Within the storage capacity of your configuration, it will execute any user-mode VMS application. Unaltered. This opens up the complete range of unique and highly specialized Digital and third party applications and tools.

For incomparable economy, the MicroVMS operating system has been packaged by function into modules. You buy just the modules you need for your environment, then tailor the system to your application. The basic system module contains all the capabilities necessary to run applications. You can then add a program development module, a choice of networking modules, programming languages, and other optional products simply and easily. Because you never buy what you don't need, up-front investment is minimized and system overhead is reduced.

For realtime control, distributed computing and network-based multiprocessing, there is the VAXELN™ realtime programming toolkit. It gives you access to all the productivity tools of VMS. Applications developed on VMS with VAXELN software can be transported to other VAX or MicroVAX I target systems for execution. The applications do not need an underlying operating system.

The MicroVAX I system will excel in a variety of applications settings. It is a team computer in business. A network node in process control. A technical workstation. It is a compact, high-powered computer that can be taken on location for seismic, marine and field engineering applications.

DIGITAL'S Q-BUS ENHANCED FOR HIGH PERFORMANCE I/O.

Inexpensive and high performing, the Q-bus™ data path has become a leader in the micro world and the choice of Digital's engineers for the MicroVAX I microcomputer.

The Q-bus data path now performs block mode data transfer, substantially improving its efficiency. The bus delivers transfer rates of over three

million bytes per second.

There are hundreds of devices and interfaces available for it. You may already have an investment in Digital's Q-bus structure. If so, a MicroVAX I system affords an easy and economical upgrade path to 32-bit power. For design start-ups, it gives you ready access to a complete range of supplementary products.

NETWORKING: YOUR WIDE-RANGING PRESENT, YOUR FAR-REACHING FUTURE.

The MicroVAX I system is a full-fledged member of one of the broadest ranges of compatible hardware ever sold. With it, you may employ a single, consistent computing strategy from micros to huge clustered systems.

(Continued overleaf)

You can progress along this computing path with ease, transporting programs and data among systems as your needs dictate.

As your micro applications grow, for example, it is easy and cost-effective to transport programs and files from the MicroVAX I computer to larger systems. Conversely, a MicroVAX I system becomes an ideal target for programs developed on a bigger CPU. The MicroVAX I computer can communicate with all of Digital's other computing systems via DECnet™ software. As part of a DECnet network, MicroVAX I systems can also be linked with highly efficient gateways leading to IBM's SNA™ networks and X.25 public packet switching networks.

Within smaller geographic areas, the MicroVAX I system connects to Ethernet (supported by DECnet software) by simply clamping onto the cable. In doing so, it becomes the first ready-to-implement microcomputer for building high-speed data communications and powerful processing into local area networks. Both MicroVMS and VAXELN software support the Ethernet connection.

ENGINEERED-IN RELIABILITY; INCOMPARABLE SUPPORT.

Like all of Digital's products, the MicroVAX I microcomputer is engineered for quality and produced to Digital's enviably high manufacturing standards.

The MicroVAX I computer incorporates many built-in system diagnostics. The most powerful of these is a microcode verify that performs a CPU self-test each time the computer is powered up. Many diagnostics run concurrently with normal processing, so if a failure does occur, it can be corrected quickly.

Every detail that helps assure reliability has been attended to. The system's 230-watt power supply, for instance, features thermal shutdown, overvoltage and overcurrent protection, a/c input transient suppression, and a minimum four millisecond powerdown time.

Overall, modular construction makes system service both rapid and inexpensive.

The MicroVAX I system is backed by one of the industry's most experienced small system support organizations. Digital pioneered on-site service with guaranteed up-time contracts and a selection of field services, software support programs, and user training agreements so comprehensive they suit virtually every need.

No other 32-bit microcomputer in history has ever offered its users greater potential for success.

While others promise performance, you'll be working with the industry standard 32-bit engine.

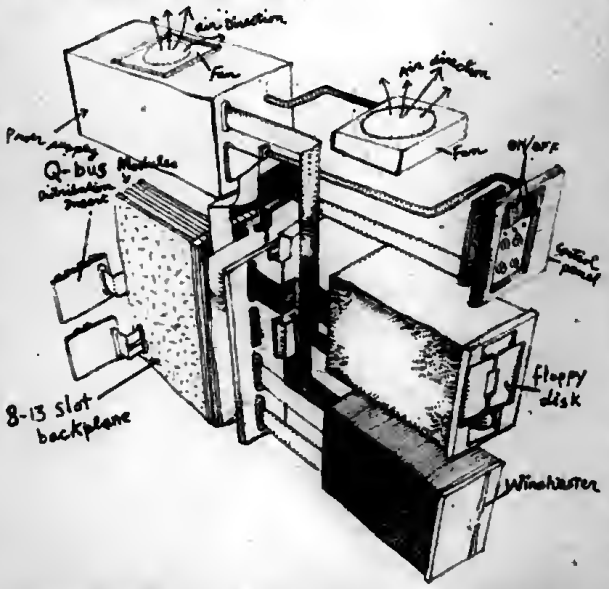
While others promise software, you'll have a choice of operating environments and programming tools.

And while others promise support, you'll be dealing with a company that has over 475 support offices in 44 countries.

DIGITAL'S MICROVAX I TECHNICAL SUMMARY

SYSTEM CONFIGURATION

Basic system for $9,995 (U.S. price, one only) includes: Two-board CPU, one-half Mbyte main memory (expandable), modular power supply, I/O port, and eight-slot Q-bus backplane. A disk-based system at $13,880 (U.S. price, one only) includes a 10 Mbyte fixed Winchester (expandable) and an 800-Kbyte floppy drive. Volume OEM discounts apply.



HARDWARE OPTIONS*		Optional	System Maximum
	Memory:	256 KB, 512 KB with parity	4 MB
	Floppy Disks:	2 x 400 KB	4 x 400 KB
	Fixed Disks:	11 MB, 31 MB	62 MB
	Communications:	1, 4, 8 lines Asynchronous Ethernet Synchronous	

*All configurations not supported by all operating systems.

SOFTWARE

Operating Environments: MicroVMS™; VAXELN.™
Supports Applications Written In: BASIC; COBOL; FORTRAN; PASCAL; PL/I; C; DSM; MACRO; LISP; OPS/5; DIBOL; RPG II.

MECHANICAL SPECIFICATIONS	Width		Height		Depth
Rack Mount:	48.3 cm 19"	x x	13.3 cm 5.25"	x x	64.8 cm 25.5"
Floor Stand:	25.4 cm 10"	x x	62.3 cm 24.5"	x x	72.4 cm 28.5"
Table Top:	54.6 cm 21.5"	x x	15.2 cm 6"	x x	68.5 cm 27"

WEIGHT (chassis only): 22.68kg (under 55 lbs.)
OPERATING TEMPERATURE: 15-32°C (59-90°F) at sea level.
OPERATING HUMIDITY: 20-80% relative humidity, noncondensing.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The MicroVAX I computer, like every Digital hardware and software product, is engineered to conform to an overall computing strategy. This means our systems are engineered to work together easily and expand economically. Digital provides you with a single, integrated computing strategy direct from desktop to data center, from chips to huge multiprocessing clusters.

As its name suggests, the MicroVAX I microcomputer is the beginning of a complete system and component program based on Digital-developed VLSI technology.

The MicroVAX I system is shipping now.

For additional product information or the name of your nearest Digital sales office or Authorized Industrial Distributor, call 1-800-DIGITAL, extension 225. Or write: Digital Equipment Corporation, Dept. MV1, 200 Baker Avenue, West Concord, Massachusetts 01742.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

digital™

*Prices apply U.S. only.

FRIENDLY from page 49

purpose of the software.

Vendors of some user-friendly software claim it is appropriate to the on-line, operational environment. While there is some truth to that, experience has shown that when user-friendly software is used on-line and operationally, the cost of hardware spirals. This can even call in to question the cost effectiveness of using user-friendly software in this fashion.

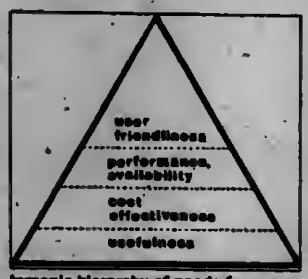
So a third major criteria — cost — is introduced for user satisfaction. The different criteria for user satisfaction at the different stages in the development life cycle are shown in the figure above.

At different stages, the user wants different things. User-friendly software greatly addresses the first criterion for satisfaction in the on-line operational environment, but usually is inappropriate for addressing the others.

Complicating matters is the fact that performance and availability cannot be addressed after the system is built. Once an on-line, operational system is built, its performance and availability profile are set in concrete. It must be completely rebuilt if the performance and availability profile is to be changed significantly.

A common misconception is that the user assumes that since a system is on a computer, it will perform well. But that misconception quickly dies in the dawn of reality as the user-friendly system competes for precious resources with other on-line activities. The user does not see this competition.

However fast and powerful the computer, the demand for its power soon swallows up any excess capacity. As long as budget, performance and availability remain the criteria for user satisfaction in the on-line, operational environment, then user-friendly software most often will be inappropriate there.



Irvine's hierarchy of needs for users

An interesting analogy can be made to Maslow's hierarchy of needs from the world of psychology. In Maslow's scheme, once a basic set of needs is met, then an individual progresses to a higher set of needs, assuming that the lower level of needs will always be met.

A very simple hierarchy of needs can be drawn up for automation that parallels Maslow's hierarchy. At the bottom of the hierarchy is usefulness. The next factor is cost effectiveness.

For the on-line, operational environment, performance and availability make up the next level of needs. Finally, at the top of the hierarchy, comes user friendliness. Once a system meets these needs, then the issue of user friendliness can become the center of attention.

DG from page 49

protocol programs. This allows files to be transferred among DG/UX and MV/UX and any other computer systems using Unix, DG claimed.

The TCP/IP costs $2,000 for an initial license and $1,500 for subsequent licenses. For users who purchase a DS/4000 workstation with DG/UX, the subsequent usage license fee is not required, the spokeswoman said.

Finally, DG announced Quickplan, a project planning package for users of Eclipse MV and DS family processors running DG's AOS/VS operating system and Comprehensive Electronic Office software.

Developed by Mitchell Management Systems, Inc. of Westboro, Mass., the Quickplan package allows users to structure time, cost and resource information in a network format.

The Quickplan package costs $7,000 for an initial license and $5,600 for subsequent licenses. It will be available in the early fall.

DG is located at 4400 Computer Drive, Westboro, Mass. 01580.

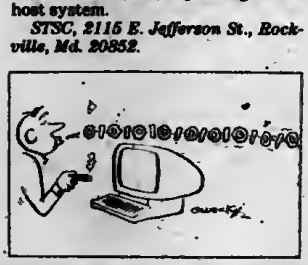
Continued from page 56

According to a spokesman, the system adheres to the draft ISO/Ansi APL standard and is fully compatible with the company's APL*Plus systems for mainframes and microcomputers. The system is written in C for portability across the range of 16- and 32-bit computers running Unix.

Among the features of the system are a shared file system that stores data in Unix operating system files and permits simultaneous read and write by multiple users and STSC's Nested Arrays System, which provides tree-structured arrays of mixed numeric and character data and is compatible with IBM's mainframe APL2 system.

APL*Plus/UNX is priced between $1,495 and $3,495, depending on the host system.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.



THE AT&T FAMILY OF DATASPEED

You need hardworking, multi-functional terminals dedicated to improving productivity.

AT&T Information Systems can help. We have a full line of asynchronous and synchronous data terminal products that enable you to move and manage information quickly. Products designed to get the word around.

Our DATASPEED® 4000 Terminals are engineered to get along well with people, too.

Non-glare, high-resolution, black background tilt screens, English language options, and lightweight detachable keyboards in typewriter format keep users comfortable and productive.

Features like windowing, split-screen mode, 80- or 132-column wide-screen format, and non-volatile PF keys help reduce user errors.

Conversational and editing terminals that speak for themselves.

The DATASPEED 4410, 4415, 4420 and 4430 Terminals are asynchronous desk-top workstations with superior features and functionality.

The 4410 is conversational, with graphics and sophisticated display capabilities.

If you need an editing display terminal, the 4415 is one of the most functional in its class. The 4420 is a feature-rich editing display terminal. It's especially engineered to help the nontechnical user become proficient quickly.

The 4430 is a conversational terminal for the multi-point, private line environment. There's no need for the computer to poll and address these multi-point terminals. This saves you valuable processing time.

Synchronous terminals on speaking terms with IBM.

AT&T Information Systems' DATASPEED 4540, Enhanced 4540 and 4540 Touch Screen Terminals are designed for a clustered, polled environment. All of these synchronous terminals are compact, modular and 3270 compatible.

TERMINALS. WE SPREAD THE WORD.

The 4540 and Touch Screen 4540 support SDLC/BSC line protocols. With one of our new controllers, you can upgrade to SNA by simply changing a diskette.

For SNA/SDLC compatability, there's the Enhanced 4540. It offers flexibility, introducing a choice of two controllers, standard- or reduced-sized displays and high- or low-profile keyboards.

The Touch Screen 4540 has 30 touch-sensitive areas on the screen which give you fast, easy access to information.

A history of communicating better.

AT&T led the communications revolution over 100 years ago. Our products and service set the standards for performance and reliability.

Today, 4,000 scientists from Bell Laboratories are working full time to develop and design new business products at AT&T Information Systems Laboratories. Products we continue to support by the largest, most experienced sales and service force in the industry.

Our family of DATASPEED Terminals incorporate Information Systems Architecture, the design principle that integrates our products so they perform as one system. As you grow, the flexibility of Information Systems Architecture allows for easy system expansion.

To learn how our family of DATASPEED Terminals can increase your profits and productivity, call 1-800-247-1212, Ext. 329.

WHEN YOU'VE GOT TO BE RIGHT.

AT&T Information Systems

WHAT DO DISTRIBUTED SYSTEMS, SECURITY, AND ADA HAVE IN COMMON?

VERDIX T.M.

Until now, there have been no production-quality systems to meet the range of DoD requirements which mandate Ada for mission-critical systems development. To address this critical need, we have developed and are announcing our VERDIX Ada Development System (VADS)™. VADS includes a MIL-STD-1815A-compliant, high-performance, rehostable/retargetable Ada Compiler, designed specifically for large-scale and embedded systems development.

The initial version of the VADS has been developed for the DEC VAX computer system, utilizing UNIX™, and includes a Symbolic Debugger, Library Management Utilities, and a Runtime System, all designed to facilitate rehosting and retargeting. Initial tests have shown the VERDIX Ada Compiler to be *significantly* faster than any other *full Ada* compiler currently available. VADS is now in Beta test. A VADS Evaluation Kit is available commencing August 15, 1984.

VADS is but the first in a series of software, hardware and systems products to be announced by VERDIX. We are also developing a family of multi-level secure computer systems and network products to meet the computer security requirements of both the government and the private sector. These multi-level secure products will utilize Ada as their native language.

Want to know more? For further information, write to Howard Nevin, Verdix Corporation, Westgate Research Park, 7655 Old Springhouse Road, McLean, Virginia 22102, phone (703) 448-1000. Or see us at AdaTEC, Hyannis, Massachusetts, commencing July 30, 1984.

IN DEPTH

Human interfaces for managers

In due course, the cost of terminals (either the desktop variety or the type you walk into or wear) will reflect more the electromechanical devices that capture personal presence — speech recognition, gesture and body sensing, eyetracking.

By Richard A. Bolt

Do managers manage information or do they manage people?

A famous professor of management writes: "Fundamentally, managers do not manage people. They manage information." Another leading teacher of management asserts that reports, charts, tables, business graphics and so forth are the *tools* of management and not management itself, which is a face-to-face process of influence and direction.

Either way, the modern manager cannot escape the fact that computers and computer-based media are fast becoming the primary means of dealing with information and with people.

At the same time, managers find that current interfaces to computers or to system terminals don't serve them very well. The keyboard with its tiny "porthole" CRT tends to distance the manager from information as much as make it available. In teleconferencing, subtle gestures and body language — so important in face-to-face exchange — become lost. Needed are interfaces that capture and convey *presence*: the direct impact of information and of people.

Getting people together electronically with information and with other people has been an ongoing goal of the Architecture Machine Group

Retrieving information by where it is in a familiar space contrasts with retrieval on a symbolic basis, for example, typing the name or code number of something on a keyboard. But it is the most common way of retrieving information. We have done it all our lives.

at MIT ever since the group's founding 13 years ago by Prof. Nicholas Negroponte. I am privileged to have been part of that group since 1976, applying a computer background with insights from cognitive psychology to the development of new styles of interaction with and through machines. Let me tell you about some of the themes my colleagues and I have worked on and how those themes may relate to development of better interfaces for those who manage both information and people.

How do managers get information? Chiefly in two ways. They ask for it: "Bring me the Brown report . . . Get me those figures on the Crosswell merger." Or, they simply put out their hand and pick it up. They reach for the file beyond the blotter, to the left of the phone; they open the bottom right drawer, riffle one-third of the way down and grasp the folder with the blue tab. Specifically, they *go somewhere* for the information in a familiar space: their desk.

Retrieving information by where it is in a familiar space contrasts with retrieval on a *symbolic* basis, for example, typing the name or code number of something on a keyboard. But it is the most common way of retrieving information. We have done it all our lives.

Spatiality in everyday life. Spatiality as a means for retrieving things occurs constantly in our daily round. Consider going to the supermarket. In the store where we customarily shop, we quickly and easily go to the right aisle and shelf to fetch what we want. A kind of ready "memory map" aids us. But if forced to go to a strange store, we spend most of our time groping about trying to find where things are. What was second nature to us at our own store now becomes an effort.

Consider newspapers. We more or less automatically find the editorial page or the sports section. The *place* where we expect that class of information to appear is consistent from day to day, though the specific content changes. And, when we go home at the end of the day; we in a sense retrieve the house where we live in the midst of a familiar locale.

Space and memory. Perhaps the first person to suggest using spatiality specifically to organize information was a teacher of rhetoric named Simonides who lived in classical Greece about 500 B.C. He taught his pupils to commit a speech to memory by rehearsing each successive part while walking in the "mind's eye" about the floor of an imaginary temple. Having rehearsed one section of the speech at one spot in the temple, the pupil would proceed in imagination to a spot further on, there to rehearse the next section of the speech. And so, on and on, until the end.

Then, when delivering the speech, the student would in imagination retrace the route about the temple floor. Stopping in the mind's eye before each distinctive point along the path, they found that the bit of the speech associated with that spot easily came to mind for recitation. This approach, called the Method of Loci, is used to this day by teachers of mnemonics or memory techniques.

How are supermarket

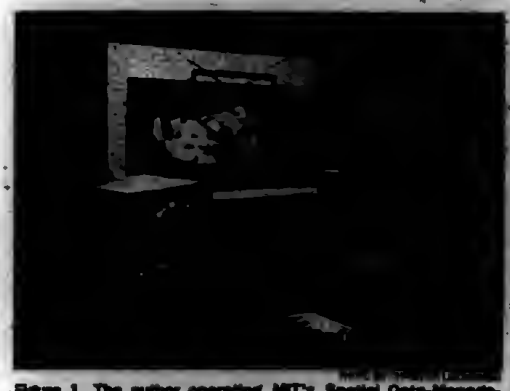
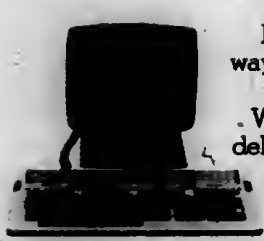


Figure 1. The author operating MIT's Spatial Data-Management System in the Media Room.

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.



DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

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Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

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Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

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a Generation ahead.

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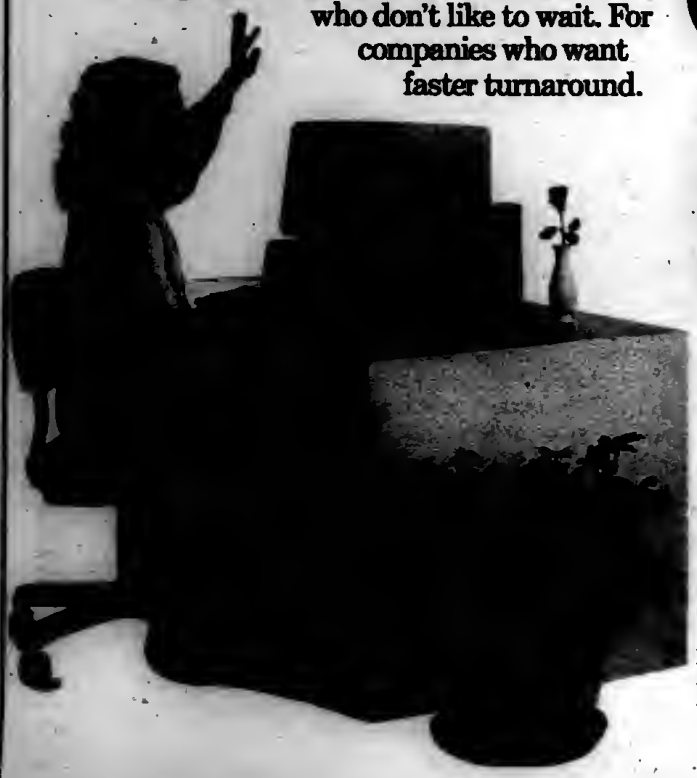
See Backlog

Dick is a gloomy programmer. See Dick work. See Dick get caught in mainframe logjams. Buried in backlog. Adrift in a sea of paper. His work gets out slowly.

See Backlog Go.

Jane is a jolly programmer. Jane has the perfect programming environment. For development. For maintenance. For users who don't like to wait. For companies who want faster turnaround.



Faster programs. Faster payback. It is made by Micro Focus. For the IBM® PC.

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Figure 2. Close-up view of SDMS's Dataland as it appears on the monitor.

Dataland is not a map of the data. It is the data. On our prototype Dataland were small maps, letters, books, TV sets, calculators and so forth. The user could travel over to them by joystick to "retrieve" them and then zoom in to activate them for perusal.

floors and ancient memory tricks relevant to modern electronic information storage and retrieval systems? Specifically, by suggesting that a manager can retrieve data not by pecking out its name or code on a keyboard, but by going to where it is in a rich graphical space.

Spatial data management

The MIT Spatial Data-Management System had its origins in a proposal sent to the Defense Advanced Research Projects Agency (Darpa) by Negroponte and me. That proposal was divided into 10 subtopics, two having to do with using space to manage data. Darpa's interest was in methods to make data retrieval easier for nonprofessional, occasional users of terminals, like military officers. After preliminary negotiation with Darpa's Cybernetics Technology Office, we began to build our Spatial Data-Management System, or SDMS.

Setting. The setting for the system was not a terminal you perched in front of, but a "place" you entered: our Media Room (Figure 1 on ID/2). This room was about the size of a personal office. One entire end wall was all screen: a 13-foot diagonal sheet of plate glass, "frosted" so that it could be back-projected upon by a color TV light-valve projection system situated in an adjoining space. The user sat in an Eam[illegible] chair in the room's center. Small joy[illegible]icks were mounted on either arm of the chair, next to small, two-inch square, touch-sensitive pads. There were two color TV monitors situated on either side of the user chair, both monitors with touch-sensitive surfaces.

An array of four loudspeakers was placed in front of the user at screen level, one at each of the large screen's corners, with an additional array of four speakers in the walls of the room behind the user chair. Thus, the system could surround the user with octophonic sound. Automatic speech recognition and synthesized speech output facilities were present, enabling user and system to talk, each to the other. A keyboard was noticeably absent to emphasize the system's nonalphanumeric way of handling information.

Operation. The monitor to the user's left bore an image of "Dataland," a personal world of data belonging to this user (Figure 2). Your Dataland would look different from mine or anyone else's, reflecting our personal caches of data and individual interests. A translucent, one-inch square "you-are-here" marker would be visible on Dataland, showing the user's current location on the data surface. This subsection of Dataland would be shown simultaneously, greatly magnified, on the large screen to the user's front.

The user could change his position on Dataland by scrolling about via the small joystick on the chair's right arm. Alternately, the user could simply touch the desired item on the Dataland display monitor or ask to be taken there: "Take me to the map at the upper left." Pushing forward on the left arm's joystick would cause a "zooming in" upon the contents of the large screen, to go in for a closer look.

Dataland is not a map of the data. It *is* the data. On our prototype Dataland, shown in Figure 2, were small maps, letters, books, TV sets, calculators and so forth. The user could travel over to them by joystick to "retrieve" them and then zoom in to activate them for perusal.

For instance, perusing a letter on Dataland meant reading it upon the big screen. The contents of the letter presumably arrived overnight as Ascii code via telephone lines. The image of the "letterhead" was stored locally and not sent with the contents. Local system "typesetting" and formatting routines would assemble the letter and set it in Dataland's mail-drop area for reading the next morning.

Perusing a book on Dataland meant reading it on the large screen, flipping its pages via touches on the small touch-sensitive pad on the user chair's arm (Figure 3). Interaction with the calculator meant zooming in upon it to cause a working version of it to come up on the right-hand monitor, there to operate it via direct touch.

Usability. Dataland turned out to be remarkably easy to use. The many guest users who visited our laboratory when the system was in active operation would learn how to use the system in no more than two minutes. The issue for them was not how to use the system but what data was there for them to explore. Most of all, it was interesting and fun to use.

The lack of a keyboard in our system was not mandatory, but, as we noted, for emphasis. Handling information spatially is not opposed to alphanumeric means, but complementary. The new dimension is that items of information whose names we can spell out also exist in definite places in Dataland's graphical space.

What Dataland does is act as a graphical counterpart to your memory of where things are. By staying spatially consistent from session to session, the Dataland image supports both our memory of where things were and our expectations about where certain data is apt to appear: the maps where we remember them in the upper left, incoming mail in the mail-drop area at the upper right.

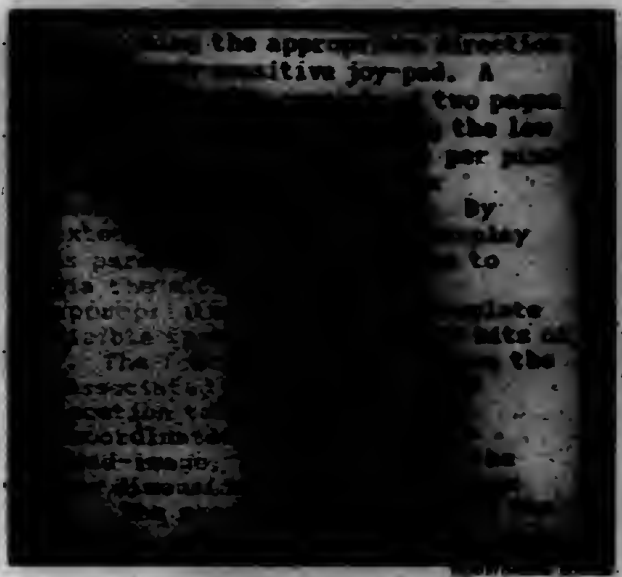

Figure 3. Pages of the "book" data-type flip by on the Media Room's screen.

Dataland is a rich audiovisual arena for the presentation of information. As such, it can form the basis of retrieval of information on the basis of our past transactions with it, a kind of "circumstantial indexing." We may remember a report not by its precise name or code number, but as the "blue covered file you gave me, oh, late last Tuesday by the water cooler." The vivid and spatially definite dealings the user has with such a milieu as Dataland permits retrieval on the basis of features and details of past interactions. For instance, we may well ask such a system: "Get me the blue covered file you showed me, oh, late last Tuesday, down there by the calculator."

Availability. We don't have such systems as SDMS now. Only superficially similar, Xerox Corp.'s Star and Apple Computer, Inc.'s Lisa have a different lineage and philosophy. Their tiny screens and overlapping windows offer a cramped and volatile space of a different spirit. Their tiny envelope "icons," for example, are not letters you can go up to and read, but are function buttons on graphical menus that cause electronic mail to be sent.

A "field version" of an SDMS derived from the MIT system was built for Darpa by Computer Corp. of America in Cambridge, Mass. That system is now operating aboard the U.S.' newest nuclear carrier, the USS Carl Vinson. This system, however, carried forward only a small subset of the MIT system's features and added special-purpose features of its own. It diverges from the MIT system enough — more "graphical" than "spatial" — to be of a different genre, not a descendant.

When some vendor will offer a full-fledged spatial data-management system commercially is hard to predict. The technology is there and has been for some time now. It is a matter of selecting and integrating components and generating

appropriate software. My guess is that they will first appear as an electronic amenity for the top-level manager, then "trickle down" the echelons as prices for quantity lots fall.

Future directions. As far as directions for future development in the concept itself, I suspect that the kinds of spaces used will become richer and more involved: for example, three-dimensional spaces — possibly holographic — wherein you can tuck all kinds of data and virtual "items." Consider, too, virtual libraries where you enter into a rich virtual stack space and "browse" about. This development would bring back into electronic book-handling the kind of serendipidity once enjoyed with real libraries and real books and which otherwise seems doomed in the new electronic age. Further, I suspect that in the cross-cultural uses of computers, other cultures will find different spaces and shapes of spaces useful and compelling, their layouts and contents radically different to suit their owners' uses.

Speech and gesture

A recent article in a noted business journal speaks of the mixed reception of the mouse. One typical style of mouse has a round ball "wheel" on the bottom and one or more buttons on the top side. The device, says the article, is regarded as unwieldy, not suited to the experienced user, not particularly useful. This is unfortunate. The mouse, and the uses to which it is being put, are giving pointing a bad name.

Another recent article, this time in a technical journal, speaks of satisfactory automatic speech recognition being years away. Current offerings have troublesome operating features and limited vocabularies. Recognition accuracy is in practice much less than the 99.8% correct levels touted by vendors.

Integrated modes. Both pointing and speech input in these instances are considered in isolation from one another. The possibility that the presence of the other mode might enhance user expression, might aid interpretation of user intent by the machine, is not raised.

We see on the current market small systems with the ability to capture pointing gesture by mouse or by touch screen. We see voice-recognition add-ons for terminals and personal computers. What we do not see is any serious use of speech and gesture together. I mean speech and gesture in the same package, with integrated software, so that the user may use either one separately or, more to the point, use them in concert to capture the conjoint power of both.

The mouse, and the uses to which it is being put, are giving pointing a bad name.

System designers yet fail to realize that these two modalities — either somewhat faulty in itself — can converge to form a conjoint modality more powerful and efficient than either one by itself; like fingers and thumb coming together to form something even more useful and powerful than either: a hand.

People always have used speech and gesture together to express themselves. It is the exception when speech and gesture are used separately and exclusively. We may use gesture alone when cut off from one another by glass walls. We may use speech alone, as when we are separated by distance and must talk via telephone. The common factor here is *separateness* of the parties involved.

Ordinarily, we communicate when in each other's presence and in the presence of the things talked about. We speak about and of things and point and look at them as well. We use gestures even when discussing abstractions, as when we talk about this factor "on the one hand" — our hands swinging to our left — and that "on the other" — swinging our hands to our right.

"Put-That-There." Some time ago at MIT's Architecture Machine Group Laboratory, I originated an experiment that integrated speech and pointing gesture together in a graphics setting: Put-

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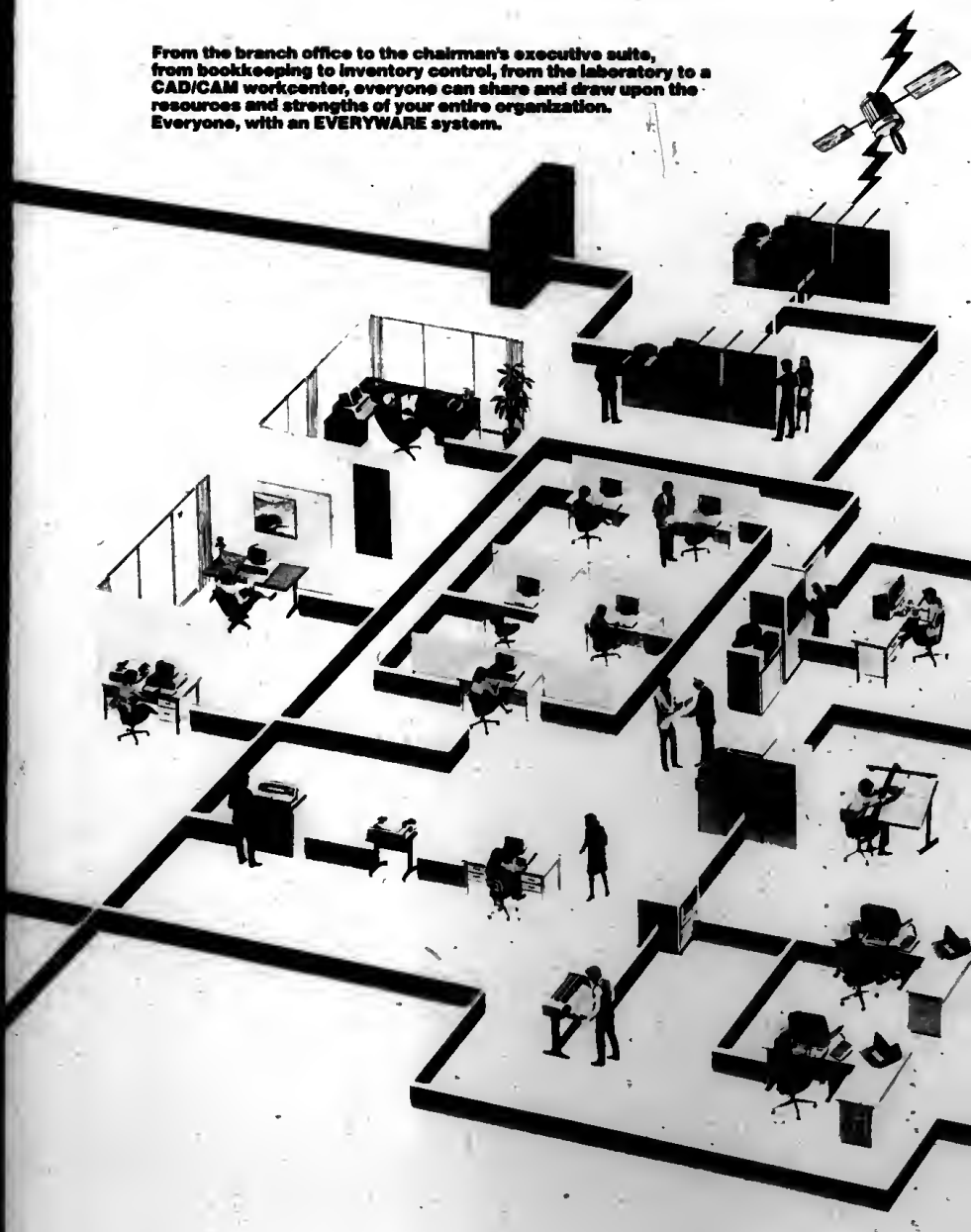

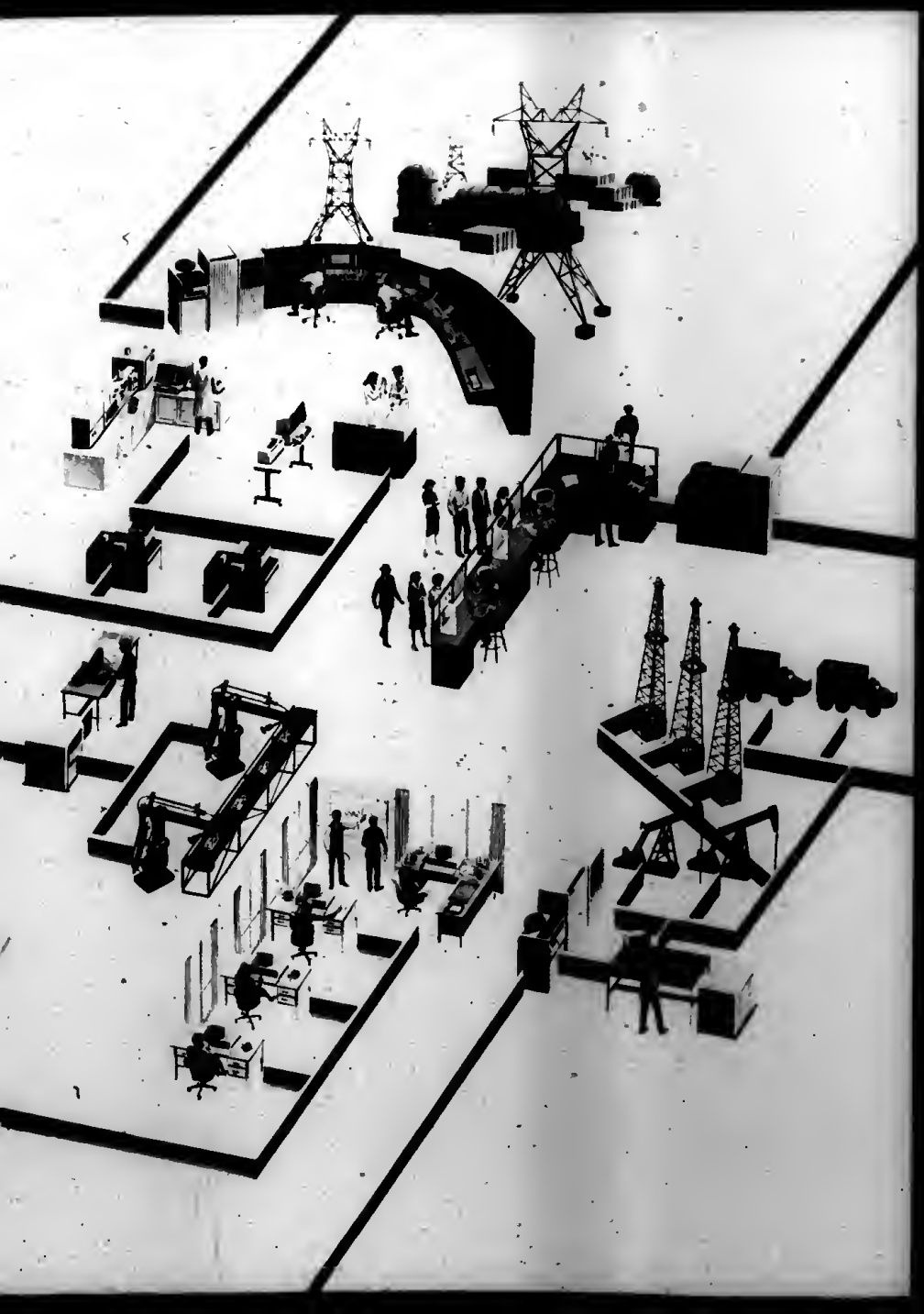

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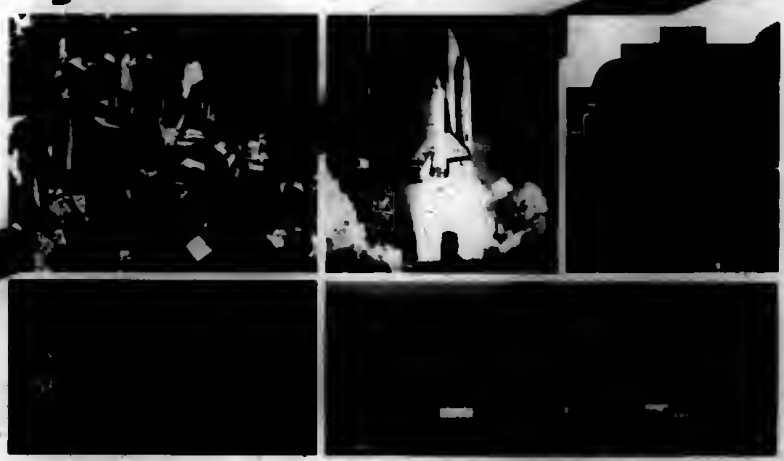

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That-There. It features an automatic connected-speech recognizer that enables speech input without the need to pause between words. A tiny three-dimensional digitizer worn on the user's wrist allows the user to point at items displayed on the Media Room's large screen while seated comfortably in the Media Room's chair.

As the name of the exercise implies, the speaker can combine words like "that" or "there" with pointing. Thus, on an originally blank display, the user can point to some spot and say, "Put a blue triangle . . . there." The system responds by creating a blue triangle at the place indicated. The user can then point at the newly created triangle and say, "Make that red," or "Make that a circle," and the change is immediately made.

Much of the system's smoothness derives precisely from the substitution of gestures for words. It's like pointing out some particular elf in a large gathering of elves, not by saying, "The green elf with the yellow ears and the blue and white polka-dot vest," but by simply pointing and saying, "Him!" The possibility of pointing plus pronouns drastically reduces exposure to the hazards of less-than-perfect speech recognition.

The system tries its utmost never to ask — via its synthesized speech voice — the user to repeat. Consider the user request, against a Caribbean Sea map backdrop, to "Create a blue sailboat . . . northeast of the Dominican Republic" (Figure 4). If the word "blue" is missed, the system simply asks, "What color?" It would not demand that the entire command be repeated.

This kind of interpretive efficiency, programmed in by Christopher Schmandt and Eric Hulteen, who did the systems work on Put-That-There, was taken to such extremes as to prompt Dr. Alan Kay in *Psychology Today* to characterize interacting with the system as being " . . . like dealing with a friendly, slightly deaf butler . . . from the standpoint of your expectations, you are willing to deal with it."

Redundancy. A major benefit to machine understanding is the redundancy arising from the combination of pointing and speaking. Both modes — speaking and pointing — can converge upon the thing intended. Even if the meaning is imprecise on either or both dimensions, the user's intention often can be salvaged by interpretation from context and the combined evidence from both modes.

Even grunts and sloppy pointing can work at times. Consider the command line: "Put the green triangle . . . there (pointing out some place)." Now suppose you mumbled a bit over the phrase "green triangle." On the basis of what the speech recognizer alone tells it, the system may well decide that the match on the phrase "green triangle" fits only marginally. Other things being equal, it would reject it and signal a nonmatch — a missed phrase. Now, let's say that you were sloppy with your gesturing as well. Thus, there is inexact information on the dimensions both of speech and of pointing.

Separately considered, the evidence is weak. Combined, however, it becomes strong. "Green triangle" is a plausible if not perfect candidate on the speech dimension. And, you did in fact point to it — though you hit other items as well. The weight of the converging evidence indicates that you probably did intend the green triangle.

Deploying resources. The speech and gesture dynamics of Put-That-There form a top-level command language for a manager in dealing with the allocation of resources: in our prototype, the deployment of ships. For every placement and movement of an item — ships or whatever — there are consequences in the data base for time, material and personnel resources. The immediate interface is the arena wherein those resources are managed by direct manipulation through natural combinations of speech and gesture.

Adding eyes. My own research agenda includes adding eyetracking to this kind of data management situation, to the ways people can communicate with computers. Where

Figure 4. Put-That-There: deploying ships via speech and pointing.

people look shapes the way they carry on conversations. Mutual gaze lets people know whose "turn" it is. Perceived eye direction functions as a "pointer" as well. In a group, someone may ask, "When's your birthday?" This question could be addressed to anyone present. But the fact that the speaker is looking right at me — and I and others sense that — makes it a different question than if the speaker were looking at the person to my left. The exact same words might be used, to be sure, but an essential part of the question is who is being asked. And that is given by eyes.

Eye contact with information

Henry Mintzberg, writing in *The Nature of Managerial Work* (Prentice-Hall, 1983), characterized the world of the modern manager as one of brevity, variety and fragmentation. The manager must keep broadly in touch with as many aspects of a developing situation as possible, yet be able to focus in upon selected aspects of that situation. It is a situation of conflict: trying to remain open to incoming information, yet needing to protect oneself from "overload."

As a visual version of this managerial situation, we created the World of Windows, a set of 30 to 40 dynamic TV episodes "collaged" together on a single large display. The intent was to simulate a set of simultaneous, ongoing, real-time events, piped in and displayed before the manager: a visual onslaught of ongoing events to be managed by gaze.

The World of Windows was displayed on the wall-sized screen of our Media Room. The "manager" was seated in the Eames chair at room center, wearing a glasses-mounted eyetracking system: a miniature corneal reflection camera mounted within a conventional eyeglass frame. (This device is made by Denver Research Institute.) These glasses give position of the eye within the eyeglass frame. We attached a small space-sensing cube — the same one used to point with in the Put-That-There exercise — to the left bow of the glasses to give position of the glasses frame within the room. The combination of these two measures determines the spot where the observer is looking.

Display driving by eye. Initially, upwards of 30 episodes would be on display on the big screen, some disappearing, some new ones appearing. The soundtracks of all the episodes would be playing simultaneously in a kind of stereo "cocktail party" effect. The observer could look around at will. Whenever the observer's eye dwelt on any one episode for several seconds, the soundtrack of all other episodes would be turned off, a kind of initial auditory "zooming in" upon the looked-at episode. Prolonged looking would cause the display to switch to a full-screen version of the attended episode. To get back the main multiwindow display, the observer would pull back on a joystick on the chair's arm.

The eyetracking apparatus we used in this study requires something picked up and worn by the manager. This is less than ideal. Better would be a system that simply tracked where the manager was looking with no awareness on the manager's part.

Unobtrusive eyetracking. The most comfortable and least obtrusive method for determining where someone's eye is looking is known as the "corneal-reflection pupil-center distance method." Despite its formidable name, the method is a simple one. We are all familiar with eye reflections, such as seeing a candle flame reflected in the eyes of dinner partners.

If we were to observe that reflection closely, we would find that its position on the cornea of the eye changes systematically as the person across from us looks about the table.

The remote corneal reflection method of eyetracking watches that kind of reflection, too, and with high precision. A small infrared light bulb is placed several feet from the observer so that, like the candle flame, it is reflected off the eye of the person whose gaze is to be measured. A special TV camera, sensitive in the infrared range, is placed several feet from the person and is zoomed in close upon his eye. The TV signal is analyzed by special circuitry and software to measure the distance between the center of the observer's pupil and the center of the little dot of reflected infrared light, to calculate, 60 times per second, where the observer is looking: his "point-of-regard." Advanced versions of such tracking systems permit a cubic foot of observer head motion and yet track point-of-regard to within less than one degree of error. (For reference, the width of the thumb held up at arm's length spans about two degrees of visual angle.)

The economics of eyetracking. These remote corneal-reflection eyetrackers are the Rolls Royces of eyetracking. Their current cost is at Rolls Royce levels: more than $100,000 for the top-of-the-line models. Much of that price is to amortize the heavy research and engineering effort that went into developing them. They tend to be one-of-a-kind, special-purpose systems, used primarily in research centers funded by the military for studying eye movements in special contexts.

Much of the cost problem is the proverbial chicken-and-egg dilemma. System designers are not yet convinced of the value of eyetracking at the interface. But as eyetracking, with gesture and speech, comes to be seen as a powerful way to orchestrate information presentation and to modulate human/computer interaction, the demand for its inclusion will rise, and, with that, its price will fall. As solid-state cameras and the necessary servo-driven lens and mirror systems become cheaper and

more compact, we shall begin to have economical eyetracking systems that can fit handily and unobtrusively into the interface setting.

Beyond making it possible for the observer to select by line-of-regard what he wants to examine more closely, how might such gaze-sensitive displaying benefit the viewer? One future application, and one high on my personal research agenda, is as an approach to "self-disclosing" systems.

Self-disclosing systems

The general notion behind self-disclosing systems is simple. They tell you about themselves. They are manual-free, doing away with the reams of printed material that tell you how to use a personal computer or terminal but often weigh more than the machine itself.

I would go beyond the manual-free concept to envision a self-disclosing system that need not tell you how to use it at all. It is instrumented to respond to your presence, and you act in pretty much your normal ways. It doesn't spend time in telling you how to operate it, but instead discloses its contents, its information base, to you as a function of the interest you exhibit.

Eyes and interest. There are two key assumptions. First, the information the system holds is put forth in a rich, graphical format; the information is "out there," visible. The second assumption is that user interest is revealed primarily via the eyes — where they happen to be looking. This includes where they happen to be looking now, plus looking patterns over time: the spread or dispersion of glances, the amount of time spent looking here or there.

There is much experimental psychological evidence to support the obvious and everyday observation that people look where they are interested. It also has been shown that people tend to look where they *listen* as well. Too, we tend to look where information was, but no longer is, as at where figures and formulas had once been upon erased blackboards, chatting and pointing all the while as if they were still there.

Consider a full-color TV graphics display that also has eyetracking; this display can tell where upon it you are looking. Consider, too, that you can point at it as well and can speak to it via speech recognition. Thus, the computer has an arena upon which it can present material to you and can tell what you are paying attention to, namely what you are interested in knowing more about.

Face-to-face meetings shall always occur. Why? Because, toward the top, managers manage chiefly through the impact of personal presence. The steady eye, the firm handshake are not idle metaphors.

Showing things off. For instance, suppose an array of stamp images is on display; the machine is showing off its stamp collection, if you will. You look broadly about the array of little colored rectangles and say, "What are those?" The system replies, "These are commemoratives from the Belgian Congo, now Zaire. They were issued between 1953 and . . ." and so on about the ensemble as a whole. Then, the system notices you looking particularly at a large triangular stamp at the lower left. It goes on: "That one is the famous 'red pyramid' issue, brought out to celebrate . . ." and so on.

Next, the system notices you are looking at a certain cluster in the upper right, while you say, "What are those?" These are the exact, self-same words that you spoke a moment before. But now your looking is concentrated upon a certain cluster of stamps in a certain locale rather than being distributed about the image of the collection at large. Thus, the same set of spoken words has a different meaning, a different referent — some part, and not the whole — as given by how you are looking. The system response is to zoom in a bit closer to the cluster of stamps of interest.

Changing focus of interest. The system tells you about that cluster and perhaps certain ones within that cluster. Then, depending upon which ones you tend to look at, the system zooms back out a bit to resume focus on the collection at-large. It can tell when this return to the overview is appropriate.

Looking patterns, when interest is saturated, are different from patterns when interest is active. In addition, inferences on the basis of what you are saying help indicate when it's appropriate to back off from a topic or to broaden it out. This kind of focusing in and out and around topics is precisely what we do when we chat about things amongst ourselves. We orchestrate that interchange by mutual gaze, not only with respect to what we talk about, but whose turn it is to speak.

So far, we have been talking about "presence" between people and computers. What about presence between managers and managers or managers and the managed? That is, not just communication with computers, but communication with people through computers?

The transmission of 'presence'

Teleconferencing is rightfully included as an integral component of modern information systems. Here, the information is the "presence" of the conferees, the actions and intentions of the participants.

Teleconferencing is almost invariably justified as a countermeasure to the costs of air travel, accommodations, the time pressures on key executives. The threshold in the organizational hierarchy below which

are the nonfliers might creep up a bit, and there may be mourning for a lost perquisite. But face-to-face meetings shall always occur. Why? Because, toward the top, managers manage chiefly through the impact of personal presence. The steady eye, the firm handshake are not idle metaphors.

An analysis of teleconferencing's impact reported in *Computerworld* (June 13, 1983) stated that the chief impediment to wider use of teleconferencing is not cost per se, but user distrust of the medium. Specifically, managers don't like how they appear to themselves on taped reviews of teleconferencing sessions: doddering, muddling, boring. Behind it all are adverse self-comparisons with polished TV network news anchors, who inevitably set the standards for poise.

Talking-head persona. One exercise carried out at MIT's Architecture Machine Group laboratory — by founder Negroponte and graduate student William Parker — involved a "talking head" persona. Essentially, an animated image of a remote teleconferencee's face is back-projected upon a translucent plastic mask. This mask is mounted on a two-way swivel joint, allowing the mask/screen to turn from side to side or nod up and down. The mask's motion is driven directly by a lightweight head-position sensor worn by the teleconferencee at his own site. The participant's head-position information is sent, multiplexed in with his speech signal, over ordinary telephone lines to the remote receiving sites, each with its swiveling plastic mask in place around the table.

Low-bandwidth conferencing. The visual image of the participant is not transmitted at all, but is generated locally at each receiving site from videodisk. Transmission bandwidth required for the conference is thus dramatically low — just telephone-grade lines. Lip movements are either a random bouncing of lips generated locally when there is speech on the line — a trick that works surprisingly well — or are generated from a set of nine basic lip and mouth positions, driven by real-time phonemic analysis of the participant's speech signal. This latter technique produces a particularly convincing effect.

The presence of the person at the remote site and of other people at his site is represented by a set of such "talking heads" situated about the table, turning, nodding, chatting with each other at each site as if all these personalities were together in the same room. Participants may have any number of reactions to how their presence is represented, but they certainly won't feel they are on TV. They may feel preposterous, but the last thing they are likely to do is make invidious comparisons of themselves with Dan Rather.

Future terminals, including those for managers, are as likely to be "dispersed" or distributed as centralized in a desktop console. An example is our Media Room, a terminal you step into, not sit in front of. A more extreme instance is where the manager in essence "wears" the terminal: a kind of instrumented business suit with super-micro electronics, where, for example, you talk to your lapel to dictate a letter or answer an urgent phone call.

This concept is not all that farfetched. The Japanese have astonished us all with their capacity for miniaturization, the "Dick Tracy" wrist TV being now a reality.

There will be a much heavier investment in the *interface* as such. In due course, the cost of terminals, either the desktop variety or the type you walk into or wear, will reflect more the electromechanical devices that capture personal presence — speech recognition, gesture and body-sensing, eyetracking — than the chips and boards that subserve computation as such, which will become relatively dirt cheap.

Keyboards will remain. They are too useful. But devices like trackballs and mouses which you need to pick up and use in a tool-like manner will give way to free gesture by arm and hand, accompanied by speech and glance. You won't have to pick up a stylus; you'll have them always ready at the ends of your hands: your fingers.

We haven't had these kinds of interfaces — highly responsive and richly parallel — before. Engineering and perfecting the instrumentation to capture these multiple human modes will be a great technical challenge. An even greater challenge will be the development of the machine intelligence to interpret multimodal human outputs and map to an appropriate response.

Computer science, psychology, linguistics, artificial intelligence, cognitive science — all will contribute to the necessary invention and insight. The result will be, for managers and nonmanagers alike, an unparalleled livability with the interface, as well as bottom-line effectiveness.

About the author

Richard A. Bolt is a principal research scientist at the Architecture Machine Group of MIT. His primary research interest at MIT is the development of new ways of interacting with computers and computer-based media.

His computer background includes scientific programming and systems work with Bolt, Beranek and Newman, Inc. and medical systems analysis at the General Electric Co. He holds a doctorate in experimental psychology from Brandeis University. This fall, as the Architecture Machine Group merges into MIT's new Media Laboratory, Bolt will be acting head of its Human-Machine Interface Group. His new book, The Human Interface, *was recently published by Lifetime Learning Publications of Belmont, Calif.*

IN DEPTH

With universal software packages already on the market for less than $1,000, just about every candidate in American politics can take advantage of computer technology.

The new political machine

By Rodney N. Smith

Computers are not new to politics. Mainframes have been used since the early 1970s to help raise money and maintain lists. But today's campaigns are using them for some very sophisticated functions. And the new generation of micros means that the technology is available not just to candidates for president but to tens of thousands of candidates right down to the school-board level.

The first documented use of computers in politics took place in 1964 when Richard Viguerie, now recognized as the grand master of computers in politics, hired the outside services of a computer firm. Four years later, he was back on the scene with his own IBM 360/30, churning out 200,000 letters.

Today Viguerie Communications, operating out of Falls Church, Va., is a direct mail advertising agency with many political clients. It focuses exclusively on conservative issues and primarily handles political action committees (PACs). The company deals with very few candidates directly, although it did raise funds for Sen. Jesse Helms' (R-N.C.) reelection campaign in 1978. Helms amassed more money than any Senate candidate ever had — $6 million. Viguerie was largely responsible.

Viguerie's firm relies on an in-house IBM 3031 for most mailings. It also runs two IBM 3800 laser printers and a 3211 high-speed impact printer. All together they comprise the most phenomenal in-house printing capacity in politics. Viguerie put out 80 million letters on behalf of New Right causes in 1982, and he plans to increase to more than 100 million pieces in 1984.

Chuck Gardner, his vice-president for data processing, says: "One of the things computers have done in the political process is to provide candidates and groups involved the chance to get their message to the voters, because before computers . . . all perceptions came through the media and the media are never without their own point of view."

McGovern Campaign

Computers, however, have never been a monopoly of the New Right. Sen. George McGovern turned to Morris Dees, the Montgomery Ward mail genius, to help raise money for his 1972 presidential campaign. Dees was so successful that McGovern ended up with a multimillion-dollar surplus despite his record landslide defeat to Richard Nixon. Then Republican Chairman Bill Brock turned to computers to rebuild the Republican Party in the wake of Watergate.

The ultimate story of computers in politics, however, comes from President Reagan's 1980 campaign. When the presidential debate finally took place, Dick Wirthlin, Reagan's pollster, had his Digital Equipment Corp. Decsystem-10 hooked up to 200 television sets in private

houses that were outfitted with rheostats so viewers could indicate how they felt about each answer as the candidates spoke.

Within read the results as they came off the computer to Ed Meese, Reagan's chief staff aide, who was in Cleveland within earshot of the candidates. Reagan could not know the results as he spoke, but his staff knew the results when they met with the waiting press immediately afterward to interpret the outcome. They knew instantly just what the public thought and how to play it.

That was still a mainframe. The first firm to offer the service of minis to candidates was Public Office, which opened in Washington, D.C., in 1977. It was founded and is run by Bill Anderson, a former congressman from Tennessee who was the first commander of the U.S.'s first atomic submarine, the *Nautilus*, which he sailed under the North Pole.

Most candidates run for office more than once, so they can spread the cost of a micro and whatever software they need over several elections, making them even more reasonable. Candidates who cannot afford their own system can usually find a volunteer willing to loan one on a part-time basis.

Anderson handles only Democrats. In some campaigns, candidates have been concerned that information was leaked to the opposing camp. "It's like Caesar's wife; there can be not even a question of a problem," Anderson says. He offers a package called Session VII primarily to major Senate and gubernatorial candidates and to official Democratic committees.

Sen. John Glenn (D-Ohio) used an earlier version, Session III, in his ill-fated campaign for president. Jerry Vento, his campaign manager, valued it most for its fundraising capacity, as did Bill Combs, 1982 campaign manager for Sen. Jim Sasser (D-Tenn.), who hired Public Office for his reelection campaign.

Rep. Al Gore (D-Tenn.) found out about Public Office from his colleague, Sasser, and today he may be its most enthusiastic customer. His campaign to vault from House to Senate has bought its own Digital Equipment Corp. VAX-11/780, according to Anderson. He is Anderson's first customer to put his entire operation in the hands of this system — everything from fund raising and budgeting to his personal schedule and press operation.

DEC chief Kenneth Olsen recently promised some "drastic" price cuts, but this technology will still be too expensive for most campaigns.

Stanley Foster Reed, publisher of *Campaigns and Elections*, the "how-to" magazine of U.S. politics, estimates there are 500,000 elected public offices in the U.S., for which about 750,000 candidates compete in each election cycle. Nearly $5 billion is spent directly and indirectly on political campaigns in the U.S. One-third of the candidates raise and spend substantial amounts of money; the average campaign is a shoestring operation costing $20,000.

Most candidates run for office more than once, so they can spread the cost of a micro and whatever software they need over several elections, making them even more reasonable. Of course, it is also possible to lease systems. Sen. Alan Cranston (D-Calif.) rented a DEC VAX-11/780 for his 1984 presidential campaign.

Most candidates who cannot afford their own computer can find a volunteer willing to loan them a personal or business computer on a part-time basis. With universal software packages already on the market for less than $1,000, just about every candidate in the U.S. can take advantage of computer technology.

It has been estimated that it would cost $30,000 to hire the services of a mainframe to do what these little systems can do for a local candidate. Obviously, the drop in price and wide market acceptance make them useful for campaigns. But

the growing user friendliness is just as important.

Political campaigns are not like businesses. They are short-lived affairs that take place every couple of years, and one person will not monopolize a system. Volunteers need to learn the system quickly, and several of them may spend a few hours every day programming data. With most of the political software packages on the market, a volunteer who is familiar with his micro can learn to put out letters in 15 minutes and can be left largely unsupervised after an hour.

Computers are almost a necessity for raising money, particularly through direct mail. According to Rob Smith of Craver, Matthews, Smith, the major liberal mail house, a mailing that yields a 2% return and an average contribution of $20 has to be considered very successful. Viguerie concurs. At that rate, 50,000 letters would have to be put out to raise the average campaign war chest.

Computers also help with the fund-raising analysis that makes any campaign more effective. They keep track of the nature of the givers — whether they are institutional donors like PACs or personal friends. They tell a finance chairman what kinds of events are most successful for that particular candidate and campaign. And they check to see if contributions are coming from particular areas.

They also keep track of who has given and who hasn't. Computers can keep soliciting past contributors again and again and stop when they have reached their legal limit.

Furthermore, all this money is better spent under the control of a computer. A basic spreadsheet operation can alert a campaign manager that too much money is being spent and not enough is coming in. It can even find the reason and, subsequently, the solution to the problem. Systems can handle basic campaign budgeting accurately and instantly.

Every cent raised and spent in political campaigns has to be accounted for and reported. Candidates for Congress must report to the Federal Election Commission and comply with its regulations. But most state and local jurisdictions have their own commissions or their equivalents, and most have adopted similar rules and reporting requirements.

Furthermore, the new militancy at the Internal Revenue Service means that every candidate for anything has to report his receipts and expenditures as well. A micro in a local campaign can automatically keep track of all this data and print the required reports in a fraction of the time it used to take.

Campaigning is principally a matter of communicating with voters. A small computer system can do all the work of a word processor, sending out fund-raising solicitations and thank-you notes to donors and volunteers, personal letters to local officials and VIPs, and press releases. At the same time, it maintains files that keep track of all this vital information.

Microcomputers can handle a busy candidate's schedule and help avoid embarrassing foul-ups. Schedules can be designed to include advance work, contacts and special notes according to the needs of each campaign. Micros help candidates remember more of the people they have met, when they last saw them and why they are talking with them now. Candidates for public office meet thousands of voters who cannot be remembered but expect to be. Computers

A basic spreadsheet operation can alert a campaign manager that too much money is being spent and not enough is coming in. It can even find the reason and, subsequently, the solution to the problem. Systems can handle basic campaign budgeting accurately and instantly.

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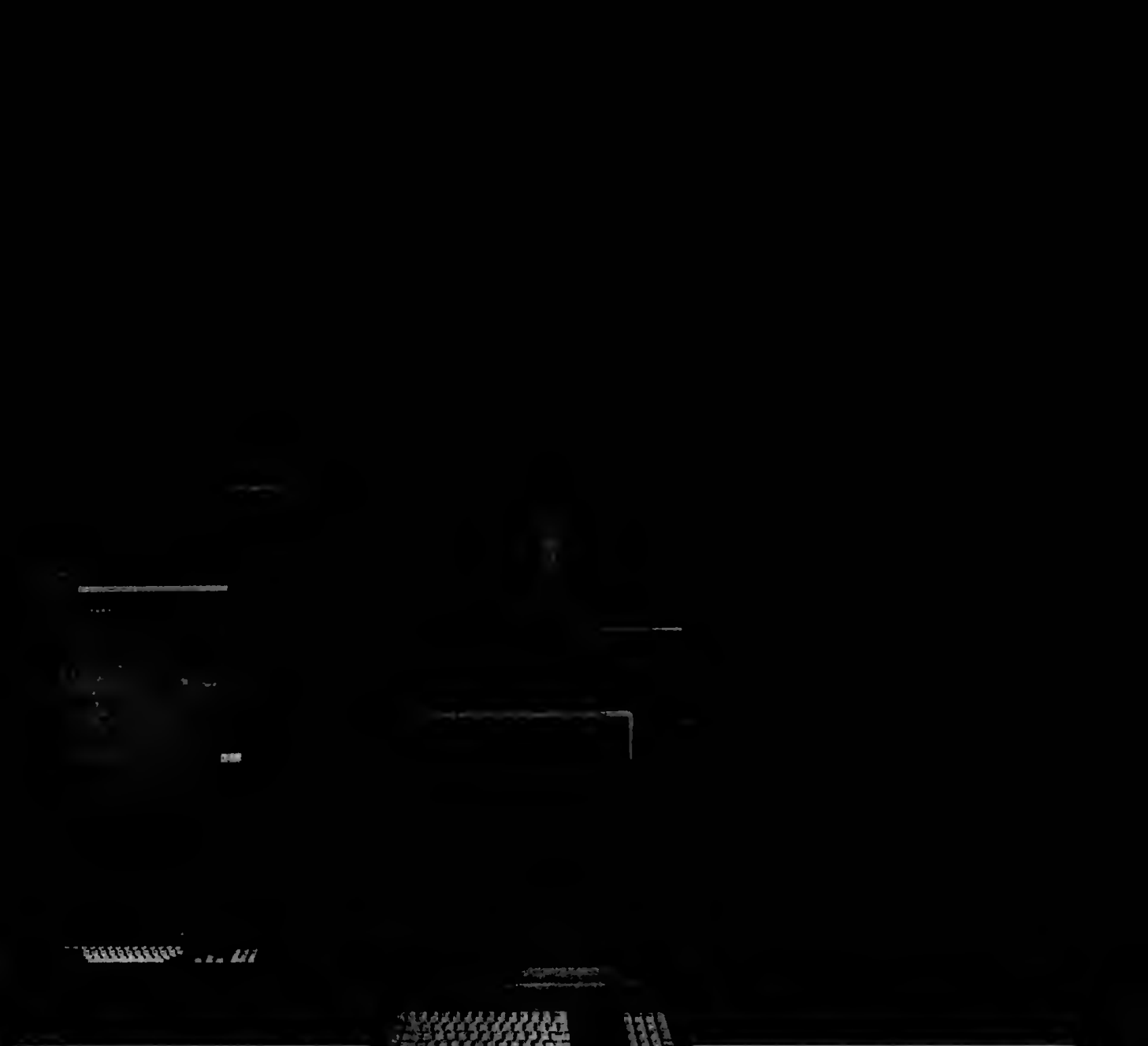

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State-of-the-art political fund raising

Operated out of Falls Church, Va., by founder Richard Viguerie, Viguerie Communications is the oldest and largest of the political computer service firms. A direct-mail advertising agency, it specializes in fund raising for conservative causes.

Viguerie Communications is as far along in the computer-assisted political mailing business as anyone. In fact, it is generally considered the state of the art in political fund raising.

Most of its work is for political action committees. The firm also serves a number of issue-oriented groups, especially pro-life and anti-pornography. Only rarely does it handle individual candidates.

The backbone of Viguerie's in-house operation is an IBM 3031, which is used to solicit contributions and thank contributors. The organization is not geared to handle mailings of less than 25,000 pieces; most of its campaigns put out 100,000 to 500,000.

Viguerie Communications also runs two IBM 3800 laser printers and a 3211 high-speed impact printer. In addition to this phenomenal printing capacity, it has 60 Beehive International micro Toppers, 30 of which act as terminals to the mainframe.

The agency starts with the concept of the issue and works through the design of the mailing package using Response Graphics of Green Bay, Wis. The company prepares copy using Micropro International Corp.'s Wordstar. Viguerie maintains its own lists and borrows some outside ones. Only the response mail — opening, counting and keypunching — is handled by outside agencies.

help maintain the illusion that they are.

The precinct-by-precinct results of past elections can be programmed into the data base along with other opinion research. All that data can then be merged both when the campaign pollster is preparing the questionnaire for conducting the poll and when the results are analyzed. The system can tell the pollster what the campaign needs to know about specific blocs of voters. And it can point to specific areas with particular problems that need special attention from the candidate or the campaign manager.

The results of any poll can be analysed instantly. Polls can be read from any micro in any meeting room that is linked up with the data base. If situations or conditions change and new questions arise, the answers are as close as the nearest computer screen.

More and more computers are starting to talk with each other in political campaigns. In her 1983 campaign for chairman of the Fairfax County, Va., board of supervisors, Pat Watt posted notices into an electronic bulletin board, asking northern Virginians to comment on local campaign issues. She tailored her notices to portable computer users by including among the issues she raised taxing computer software as personal property (Virginia has a personal property tax that does not include software) and locating a high-tech center in northern Virginia.

In Michigan, state Sen. Bill Sederburg and Gordon Haslett, operators of a computer public service network called Compunet Bulletin Board, set up "Political Forum," a free, 24-hour computer information and correspondence program on political issues.

"In the first two months of operation, 'Political Forum' received more than 1,000 messages, including questions and comments on political and legislative issues," Sederburg says. "I have received more than 50 messages a week on various political topics, to which I have responded directly." Sederburg is using his own home computer for the service, and he thinks programs like it are going to become important supplements to questionnaires and newsletters.

The software for doing all this already exists. The most popular package so far for micros is Campaign Manager, put out by Aristotle Industries in Rowayton, Conn. It was written by 26-year-old Dean Phillips, who had helped out in his brother John's two unsuccessful bids for Congress and realised they didn't need mainframe horsepower.

One of Aristotle's 1983 clients, Thom Serrani, was elected mayor of Stamford. George Jepsen, his campaign manager, says: "I purchased Campaign Manager and an IBM XT for the mayoral campaign. The polling, direct mail and fund raising paid for the system, and we won an upset victory in the primary." It is also compatible with Apple equipment and costs only $500.

Politech I, a newer package from Political Technologies in Ellington, Conn., is billed as "The Big Time Computer for the Small Budget Campaign." It costs $960 and can handle the same chores. It is compatible with more equipment than any other package, including IBM and IBM

compatibles, Digital Equipment Corp.'s Rainbow, Sperry Corp. models 20 and 40, Kaypro Inc. models 4 and 10, Victor 9000, Xerox Corp. 820/2, Texas Instruments, Inc. Professional and Zenith Data Systems Corp. Z100. Like Aristotle Industries, Political Technologies offers a toll-free number to help clients.

Rep. Bob Carr (D-Mich.), a liberal, was swept out of office in the 1980 Reagan landslide. Reelected in 1982, he has bought Politech I in the hopes of holding onto his seat in 1984. Doug Sosnick, his administrative assistant, says Carr "has made it the bread-and butter of his reelection campaign." On the other side of the aisle, Rep. Nancy Johnson (R-Conn.) also has bought the product and is structuring her reelection bid around it.

One of the newest firms, Campaign Software in Washington, D.C., offers its package only to Republicans. Dan Prahm and Jon Mosle,

Democrat Buddy Darden used his microcomputer to raise $320,000 during a nine-week campaign.

friends and former roommates just out of Harvard, operate their firm from the Heritage Foundation. Their software package, Campaign, costs $795.

Prahm says Campaign is particularly effective for state legislative campaigns. At that level, the system can help identify and track favorable voters, ensuring that they get to the polls on election day.

Campaign seems to have worked in 1983 in suburban Fairfax, Va., for John Russell, a retired intelligence officer who ran for the state Senate. His district had never elected a Republican. He used his computer to mail an older-person-to-older-person appeal to voters over 55. "I didn't win by much," he says, "so it may have been the difference."

The newest package on the market is The Campaigner, offered by Rainbow Management in Westport, Conn., and Austin, Texas. The software, costing $930, is too new to evaluate its usefulness.

Another package, Solon, is put out by Q Systems in Summit, N.J. Q Systems is also an IBM dealer, and it sells an upscale hardware and software package for $16,500. Obviously out of the price reach of most candidates, Solon is pitched toward major campaigns for governor and the Senate. Q Systems will sell its software package separately, but it still costs three times as much as the other packages.

Another firm, Diversified Computer Services in Annandale, Va., sells Financial Reporting Services. This package only handles financial reporting while costing $5,000. Another operation, Voter Contact Services in Honolulu, is developing the software to get into the market but has not yet gone public.

There is growing evidence that all this computer activity is having an impact. Last year, when popular Rep. Larry McDonald (D-Ga.) was shot down in the Korean airliner, his widow ran to succeed him. She was nosed out in the Democratic primary, however, by Buddy Darden, who used his microcomputer to raise $320,000 in the short, nine-week campaign.

Harvey Gantt, a Democrat running for mayor of Charlotte, N.C., employed Allyn McGillicuddy, his headquarters coordinator and a service representative for IBM, to computerize his campaign. He went on to win the election with 52% of the vote, becoming the city's first black mayor.

The first documented case of micros in campaigns took place in the tiny mountain town of Bozeman, Mont., in 1981. In April, the voters defeated a referendum to build a new school. Using his little Apple II Plus, Dr. John Tkach, the local dermatologist, programmed lists of all 550 registered voters and parents with children in school. Local parent groups then called each likely supporter, and the results of the election were reversed.

President Reagan is using computers at different levels. His volunteers were on the phones early, identifying his supporters and entering pertinent data into IBM Personal Computers. The Republican National Committee urged local candidates to pick up IBM-compatible equipment. Lists of his supporters were turned over to local, especially Senate, candidates to help them get out the vote on election day. That procedure lets the president count his election day activities as "joint expenditures" and thus, not count them against his $20 million general election limit. That will let him outspend the Democrats by about $6 million.

George Orwell was right about computers. In 1984, they are very important in politics. But he was also wrong. They are having a decentralizing impact. They are making powerful technology available to many more candidates than ever before, not just well-financed ones.

And computers are greatly enhancing the role of volunteers by multiplying the numbers of voters they can contact in a given time period. Far from becoming Big Brother, they are enhancing the democratic nature of the country's political process.

About the author

Rod Smith is a free-lance writer based in Falls Church, Va. He formerly worked for Rep. Michael J. Harrington (D-Mass.) and Rep. Elizabeth Holtzman (D-N.Y.).

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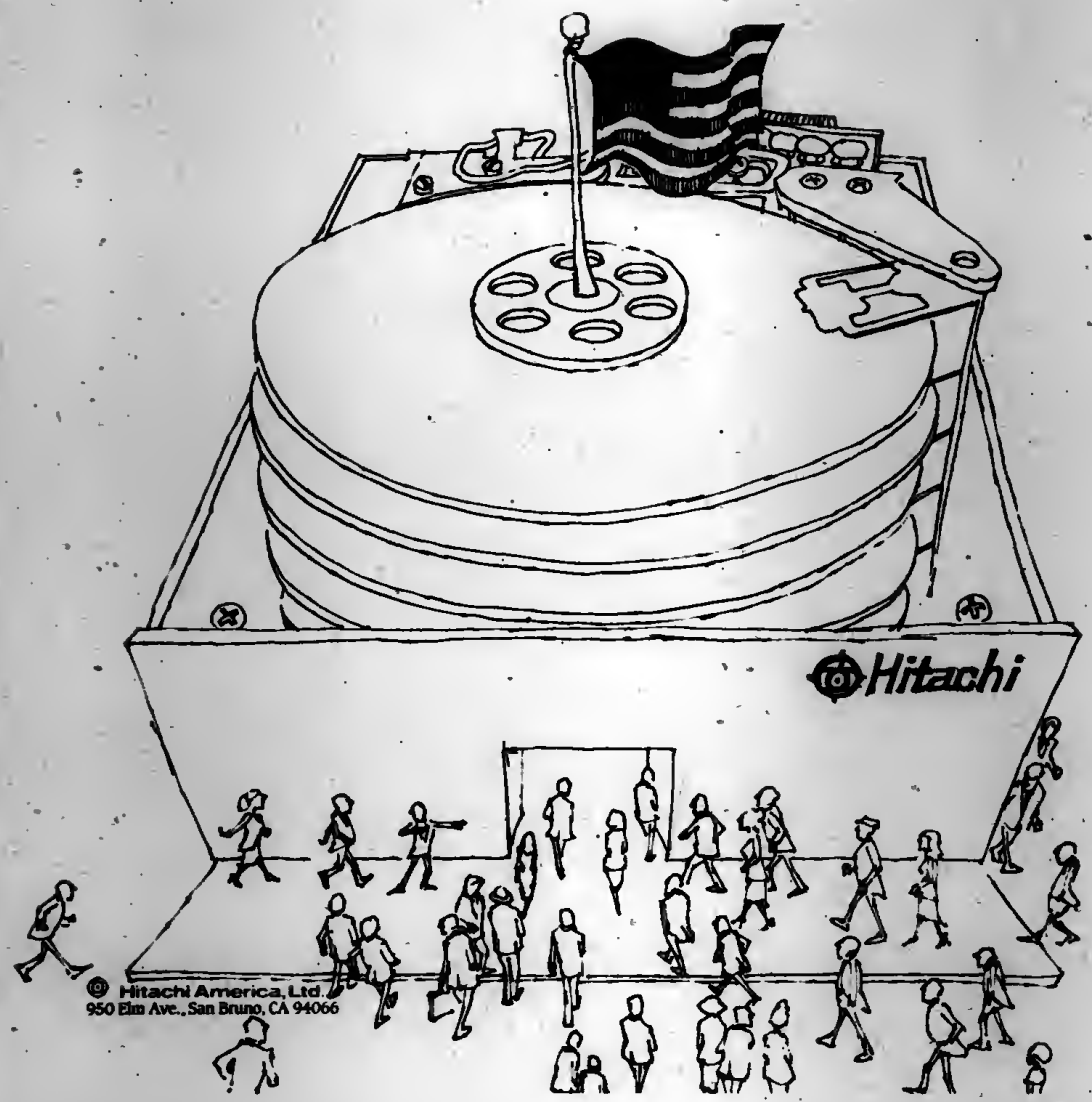

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IN DEPTH

Can fifth-generation software replace fallible programmers?

Fifth-generation technology is changing organizations. Management must be prepared with a plan, understood by all, of how each individual's energies and talents may be best reassigned now that many repetitious tasks need no longer be performed by people.

By Roger Philips

A major utility in the South recently installed a fifth-generation product. The initial applications required about six man-months to specify and used one hour of CPU time to generate. The result was 700,000 lines of Cobol code which, the company estimated, would have required more than 40 man-years to develop conventionally.

A new technology in software development is taking shape. The ability to automate fully the development process — from design through installation — is now available. This technology has many far-reaching ramifications for software developers and software users, not all of which are immediately apparent.

Before exploring those consequences, we should examine and redefine some catchwords that have been loosely or downright inaccurately applied in the past. Fourth-generation languages have been with us for at least 10 years. These languages represented a step in the direction of reduced complexity and greater economy of expression when programming application software.

However, despite vendor claims, no fourth-generation language is "nonprocedural." They all still require specification of the sequence of steps necessary to achieve the desired result. The "how" must be given in order to achieve the desired "what."

This requirement entraps the fallible human programmer into the same morass as first- through third-generation languages — out-of-place statements, erroneous logic, multiple logic paths and if-then-else constructs inevitably leading to bugs and the requirement for testing, recode, retest and so on.

In their article, "Reusable Code, Reliable Software" [CW, March 26], Arnold Romberg and Alan Thomas correctly state that it is much more accurate to call these languages "less procedural" than "nonprocedural." For the purpose of clarity, let us use the term "functional" to mean what "nonprocedural" ought to mean — that is, a language in which only the "what," not the "how," need be expressed. One good test for a functional language (even the word "language" implies procedure and is not completely satisfactory) is if the statements in a "program" may be interchanged or shuffled with impunity, always giving the same result.

Programmers' tool kits

Another term that has been misused is "application generator." Products described as such always turn out to be only partial generators or, at best, program generators. Many are, in reality, programmers' tool kits that assist in automating selected tasks in the programming process. They generate, for example, the data structures and the data base management system calls, or all but the program logic. They invariably require the skills of a programmer to complete the missing pieces.

The results then fall heir to all the frailties of any procedural expression — debugging, recoding and so on. True, they may improve programmer productivity manyfold, but they do not fully automate software creation or free the MIS department from dependence on "private knowledge" of individual programmers.

Hence, the use of the term "fifth-generation software" is now used to label accurately the new technology, the advanced wave of which has already arrived. Romberg and Thomas have provided us with an excellent working definition of fifth-generation software: This is software with " . . . which the man/machine interface is only at the specification level, while the organization of specifications into the facts needed to create an information processing system is carried out by the software development system."

Backlog still exists

Proof that fourth-generation languages and application generators don't solve the applications backlog problem is manifold. The backlog still exists, and the great majority of business applications are still hand coded in Cobol. One major oil company has become so overrun with these kinds of products (the company estimates it has bought more than 100 of them) that it will acquire a new productivity product only if that product entirely eliminates the need for several existing ones.

One weakness of existing methods is the possibility of creating erroneous structures. In fact, this ability is all too easy. Fifth-generation software always produces programs that work. They may not function as the specifier intended, but they always perform the functions specified. The other weakness is discovered when it becomes time to enrich or maintain the software.

With procedural programming, this process too often takes the form of restructure and retrofit rather than extend and change. Each modification is accompanied by its necessary testing and rework, coupled with the frequent discovery that a change in one part of the system produces an entirely unexpected (and undesirable) change in an apparently unrelated part.

Since post-initial development activity (maintenance, enhancement) typically consumes more than two-thirds of the programming effort required during the lifetime of an effective application system, saving in these areas is even more rewarding than saving in initial development.

By getting fallible humans out of the rework/refit process, the fifth-generation tool can impressively

affect life-cycle costs of application production.

One of the most interesting consequences of fifth-generation technology is the sociological one. While the power of this software gratifies some, it makes others distinctly uncomfortable.

James Martin, in *An Information Systems Manifesto*, characterized the job of programmer as " . . . in a sense . . . inhuman because we require him to write a large amount of complex code without errors. But his animal-like brain cannot handle meticulous detail and the vast numbers of combinational paths. Furthermore, if we want 1,000 lines of code produced per day, not 10, then the job is even more inhuman. It is a job for machines, not people."

Upon hearing a presentation of a fifth-generation product, a programming manager at one of the world's largest banks quickly grasped the power and the usefulness of the approach. But one thing bothered him. "You say this approach will eliminate testing," he said. "But testing is just about all we do around here." Unspoken, but clearly a concern, was: What will we do when testing — that is, proving the programs work — is no longer needed. Still required is function testing — that is, did we automate the function we intended to automate?

In a similar situation in a major aerospace company, the data base administrator was impressed but skeptical. "This product may be too powerful" was her reaction. "I'm not sure the programmers will accept it."

Well, some programmers may not accept it. It will certainly change their jobs. Many others will realize freedom from clerical coding tasks and frustrating, time-consuming testing to create programs that are still riddled with latent bugs.

These are real questions and must be addressed with real answers. Fifth-generation technology is changing organizations and functions. Management must be prepared with a plan, understood by all, of how each individual's energies and talents may be best reassigned now that many repetitious tasks need no longer be performed by people.

Martin sets the stage for the fifth-generation technology in his book *Application Development Without Programmers*. Forward-looking DP managers are now actively searching for a fifth-generation product appropriate to introduce into their organization.

Bank develops criteria

At Valley National Bank, the nation's 25th largest, a number of criteria have been developed. These include:

- Prototypes should be produced from specifications. The entire "specification-to-implementation" process should be fast, reliable and inexpensive. Thus, many iterations of a user-interfaced design will be supported.
- There should be no errors created during the process. The validity of the resulting implementation should be generated by the process rather than by testing or correctness proofs.
- Implementations should be cheap enough that developers can experiment with alternative implementations.
- It should provide for reusable design parts.

Proof that fourth-generation languages and application generators don't solve the applications backlog problem are manifold. The backlog still exists, and the great majority of business applications continue to be hand-coded in Cobol.

- The tool should support a development methodology, not vice versa.

With these criteria in mind, what should an effective fifth-generation product do?

- It should be simple in its requirements input. Specification entry should be natural and easy to learn.
- It should be general and not tied to any specific application area or discipline. It should be capable of creating any business application.
- It should create efficient systems. To be practical, high-transaction volumes with multiple large data bases must execute with response times equivalent to handwritten code.
- It should create complete systems — not individual programs. Program-to-program interface is a common area of system failure.
- It should, of course, generate correct systems from purely functional input.
- It should be extendable in generated system architecture. Design parts must be readily identifiable and reusable. By reusing design parts, an overall development methodology can be practically imposed on the development process.
- Generated applications should be compatible with existing ones. Few users are likely to re-create all applications at once using the fifth-generation tool.
- It should support easy prototyping. Such prototypes — rather than being discarded as are many fourth-generation ones — may be enriched and expanded into the full working application.
- It should support the management of multiperson development projects. It must identify design parts such that their status and ownership are readily obtainable. Design

Some programmers may not accept fifth-generation tools. They will certainly change their jobs. Many others will realize freedom from clerical coding tasks and frustrating, time-consuming testing to create programs that are still riddled with latent bugs.

parts should be subject to automated revision control.

■ It should be rich in design options. Generated systems should support, for example, audit trails, transaction reversal, security, data base freeze/unfreeze, performance optimization, extensive data edit capability, Help functions and full screen and terminal capability.

With such tools, the whole approach to application creation could change. An organization ideally suited to taking advantage of a fifth-generation product would be one like TRW, Inc., where each user division has its own small group of system analysts who create specifications to hand over to software development. If these analysts instead capture their specifications in the form required by the fifth-generation product, the whole back end of the process would be automated, and a one- to two-year lead time could be cut to several hours. Of course, certain functions will continue to require human planning and intervention.

The data base administrator function (sometimes called information resource manager) is still needed to coordinate and assign the use of the corporate information resource. And the analyst, as Romberg and Thomas state, is " . . . freed to concentrate entirely on issues of usability and architecture."

Desire for data

The development manager must recognize the tremendous desire on the part of the expanding personal computer population within his company for software and data, specifically data from the corporate data base. A fifth-generation product should provide the ability to specify applications on either the mainframe or the micro and upload or download the specifications for target application creation as needed. With the power of this approach realized, a conceptual merging of the development center and the information center is possible.

Of the newly emerging examples of fifth-generation products, Higher Order Software, Inc.'s Use.it offers "provably correct software." This product has been used successfully in implementing small systems.

Iconics, Inc.'s Transform/IMS provides fifth-generation product capability in the IMS DB/DC environment and satisfies most of the criteria given above for fifth-generation products. It produces complex on-line applications automatically that function efficiently in high-transaction-volume systems.

No data processing manager can afford to ignore this emerging technology. The days of hand-coded programs will eventually be viewed as a "temporary aberration," according to James Martin. Those who take early advantage of the new ways will profit most.

Most DP departments have spent their entire existence automating users' tasks. The technology is now at hand to automate DP's principal task — software development. Fifth-generation systems provide the means to accomplish this long-awaited goal.

About the author

Roger A. Philips is president of Iconics, Inc., a Scottsdale, Ariz., software company specializing in fifth-generation products. Philips has more than 17 years' experience in software development. Before coming to Iconics, he was vice-president of Informatics General Corp., with which he was associated for 10 years.

COMMUNICATIONS

AT&T multiplexing service awaiting FCC OK

BEDMINSTER, N.J. — AT&T recently proposed a new service that would nearly double the voice transmission capacity of a T1 circuit while also handling data traffic. If authorized by the Federal Communications Commission, M-44 Multiplexing will become available early next month.

The minimum price of the new offering is $1,000/mo, but it could save more than that for some users, according to James Shannon, staff manager of new services development at AT&T Communications.

The economies of the new service are achieved by combining 44 voice signals that have been digitized at 32K bit/sec — instead of the usual 64K bit/sec rate — over a single T1 facility operating at 1.54M bit/sec.

Voice digitization is accomplished at one of two places with M-44: within the AT&T network or on the customer's premises. When provided by AT&T from one of its switching centers, service support is provided to the user over 44 individual analog voice channels. Alternatively, voice signals can be digitized at the customer's site and supported directly by a T1 digital facility. Combinations of these facilities reportedly can be accommodated.

The latter version of the service will allow a user to transmit 44 digitized voice signals end-to-end, Shannon explained. To do that, a user will need a channel expansion multiplexer at both ends. This device converts voice signals that have been digitized at 64K bit/sec into 32K bit/sec signals and performs the opposite conversion at the far end of a circuit.

The multiplexer is available from AT&T Information Services, the phone company's equipment marketing arm, or from independent terminal makers. AT&T sells it for $14,500; the lease charge is $485 to $730 per month, depending on contract terms.

In either case, the user must also pay a one-time $870 installation charge, and if he buys the channel expansion multiplexer, there is a $202/mo maintenance charge.

In a typical case, Shannon said, the user would install a channel expansion multiplexer at his headquarters site and rely on one or more AT&T Communications serving offices to perform the required multiplexing at the other end of the message path.

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INSIDE

PBX system targets tenants

NASHVILLE — Northern Telecom, Inc. recently announced a multitenant telecommunications software package that reportedly will enable building owners to offer individual tenants the advantages of a full-feature digital private branch exchange (PBX).

According to a spokesman, the Enhanced Multitenant Service for Northern Telecom's SL-1 family of digital PBXs offers shared access to communications trunk, integrated voice and text messaging and automatic call distribution. An SL-1 system, equipped with the Enhanced Multitenant Service, reportedly can be operated as 32 PBX systems.

The spokesman said each unit would have the potential to serve as many as 512 tenant groups, and the SL-1 PBX could allow or deny tenant organizations to call one another.

It is said to improve control and efficiency by permitting tele-

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UBC renames tenant network

ATLANTA — United Business Communications, Inc. (UBC) recently announced a new name for its multitenant shared communications systems that it markets to commercial builders.

A division of United Telecommunications, Inc. and a subsidiary of Isacomm, Inc., UBC markets voice and data communications systems to building developers. The developers offer their tenants use of these systems, obviating the need for each tenant to procure their own system.

The company was formed as a joint venture between United Telecommunications and Olympia and York, a large real estate development company.

The first product of UBC was Olympianet, which called for the installation of Intecom S-80 telephone switching systems in 23 of Olympia and York's buildings nationwide. These buildings can be

See UBC page 70

MIT researchers shifting from superminis to micros

CAMBRIDGE, Mass. — Computer researchers at MIT, long dependent on large systems such as Digital Equipment Corp.'s VAX superminicomputers, have shifted much of their work to a string of 30 microcomputers linked by a Xerox Corp. Ethernet local-area network.

The Laboratory for Computer Science, which helped pioneer time-sharing 30 years ago and developed the Multics time-sharing system in the late 1960s, has installed and is in the process of fully implementing a prototype network using Nu Machine personal computers.

The Nu Machine, and its 32-bit Nubus data bus, was developed at the laboratory and has been licensed to Texas Instruments, Inc., which built the machines, reported Stephen A. Ward, an associate professor of computer science and engineering at MIT.

The Nu Machines are being used to develop further MIT's experimental Trix distributed operating system, as well as graphics, word processing, office automation and computer-aided design applications.

Ward reported that MIT had little difficulty linking the 30 machines through Ethernet, which allows several of the 2M-byte main memory machines to operate as file servers for the others.

Michael L. Dertouzos, director of the laboratory and professor of computer science and electrical engineering, noted, "Using the Nu Machine will be like working with a time-sharing system, but with the convenience of having one's own data base at hand and of never having to wait in a queue."

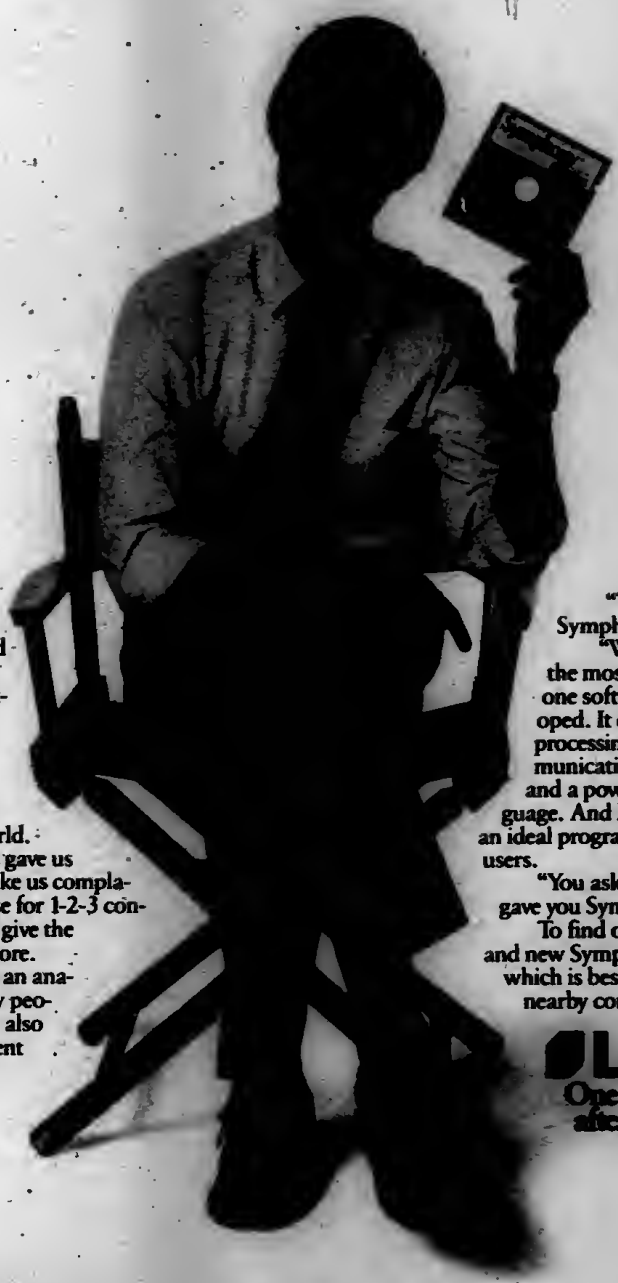
Unlike a time-shared system that can have at most 50 or 100 users, a network of interconnected Nu Machines can support a larger number of users, Dertouzos said. "The revolutionary aspect of these developments is the transition from single-computer environments to large computer

See MIT page 70

"You asked for an encore.

Brian Stains is the Symphony Program Manager at Lotus Development Corporation. He was previously involved with the development of 1-2-3 software and is one of the original members of the company.

We gave you a Symphony."



"It took a dedicated team to create what the business community termed 'an overnight success.' But that's just what 1-2-3™ software became.

"When people discovered the incredible speed and power of 1-2-3, they made it the number one PC business software in the world.

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"We realized 1-2-3 was an analytical tool that solved many people's business needs. But we also talked to people with different requirements.

"We listened and we learned.

"The result is new Symphony™ software.

"We believe Symphony is the most comprehensive, all-in-one software system ever developed. It combines word processing, spreadsheet, communications, database, graphics, and a powerful command language. And like 1-2-3, Symphony is an ideal program even for first time users.

"You asked for an encore, we gave you Symphony."

To find out more about 1-2-3 and new Symphony software—and which is best for you—visit your nearby computer dealer.

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Despite detariffing order, problems with CPE remain

WASHINGTON WIRE
Phil Hirsch

The Federal Communications Commission recently addressed some problems associated with the detariffing of telecommunications customer premise equipment (CPE), but some problems remain.

Notably, uncertainties still surround AT&T Information Systems' price predictability program — the period during which AT&T is obligated to lease its installed equipment at rates that cannot exceed specified levels.

Last November, the commission said the price predictability program for each category of embedded CPE would kick in once AT&T offered equipment for sale and would terminate two years later.

Official announcement

AT&T Information Systems sent a letter to its leased terminal customers late last December telling them their terminals would be available for purchase Jan. 1, 1984. This letter, AT&T Information Systems insists, embodied the official announcement that this equipment was up for sale as required by the commission's November 1983 Customer Premise Equipment Detariffing Order.

Others disagree. The International Communications Association (ICA), a group of the largest communications users in the country, argued that the letter was not a bona fide sales offer. "At a minimum," the association told the commission in January, any such offer "would have to provide the customer with immediate access . . . to firm sales prices and the related terms and conditions of sale."

Given the uncertainty surrounding the actual date that equipment became available for sale, the ICA has recommended to the commission that the two-year price predictability program be extended for all users until March 1, 1986; it is now scheduled to end for some users as early as December 1985.

The ICA also wants AT&T Information Systems to pay cash refunds to leased terminal users who requested sales quotes for equipment but did not receive them before price increases were imposed. According to a comment the association submitted to the commission June 26, "there is a substantial group of embedded CPE users who have [requested] complete, itemized sales quotes in writing from [AT&T Information Systems]; nonetheless, exclusively as the result of inertia or disorganization on [AT&T Information Systems'] part, such quotes have not been provided . . . on a complete and timely basis before lease price increases were implemented."

In addition, the association believes that, for those users who want sales quotes, the program should be extended further; all customers should be given 30 days to request sales quotes, and for those who did so, terminal lease prices would remain predictable for another two years.

ICA said that the FCC should declare that a user's basic telephone service cannot be terminated by a divested Bell operating company, which acts as collection agent for AT&T Information Systems in many areas, if the user disputes the bill for terminal charges.

Finally, the association wants the commission to order the telephone company subsidiary to send each of its leased terminal customers a notice explaining all of these new terms.

DEC announces PBX interface

MAYNARD, Mass. — Digital Equipment Corp. has announced a computer-to-private-branch-exchange (PBX) interface supporting the computer-to-PBX interface standard developed by DEC and Northern Telecom, Inc.

The CPI32-A was designed to reduce the cost and increase the efficiency of computer-to-PBX connections, according to DEC. It reportedly can be used with DEC's VAX-11 family of superminis under VMS.

The unit, designed to switch data from local and remote terminals to a host computer, multiplexes 24 asynchronous data streams over the standard twisted-pair telephone wiring that exists in office PBXs for voice and data, a DEC spokesman said.

The CPI32-A reportedly is based on T1 carrier specifications using a 1.54M bit/sec channel.

The DEC CPI32-A is scheduled for delivery in the fall and costs $7,200.

DEC is located at 146 Main St., Maynard, Mass. 01754.

NCR Comten offers network tool

ST. PAUL, Minn. — NCR Comten, Inc. has introduced a network management and control product that is said to give users real-time status and configuration information on communications lines terminated by the vendor's 3600 communications processor.

The Communications Alerting Facility 1 Release 1 (CAF1 R1) is also said to give network operators dynamic control over the alarm, logging and display parameters for their network.

According to the vendor, the product gives network control flexibility to users by allowing them to establish performance thresholds and parameters for individual lines or groups of lines. CAF1 then audibly or visually alerts users whenever any monitored communications line does not meet the defined criteria, the vendor said.

CAF1 R1 consists of a software module, the vendor's color T-4060 or monochrome T-4017 keyboard CRT terminal display and an optional line printer.

License fee for the software is $150/mo or $1,650/year. Purchase prices are $1,425 for the color display, $714 for the monochrome display and $780 for the printer, the vendor said.

NCR Comten is located at 2700 Snelling Ave. N., St. Paul, Minn. 55113.

MULTIPLEXERS/ MODEMS

PROMETHEUS PRODUCTS, INC.
Promodem 1200

Prometheus Products, Inc. has unveiled a 300 to 1,200 bit/sec modem with a built-in clock/calendar. The Promodem 1200 design allows the addition of an optional buffer memory with up to 64K bytes of storage.

Standard features include autoanswer and autodial, programmable intelligent dialing, tone and pulse dialing, built-in speaker with volume control, separate phone and data jacks to permit switching between voice and data and diagnostics.

Promodem 1200 costs $495.

Prometheus Products, 45277 Fremont Blvd., Fremont, Calif., 94538.

RACAL-MILGO, INC.
Omnimode 14.4

Racal-Milgo, Inc. has announced the Omnimode 14.4, a modem that operates at speeds up to 14.4K bit/sec.

The Omnimode 14.4 has diagnostic capabilities and a remote-modem control option that allows central-site control of remote-modem speed, port configuration, transmit level and modulation without the involvement of remote operators or technicians.

It is available in both stand-alone and central-site models.

The price of Omnimode 14.4 is $10,000.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

PENRIL CORP.
Auto Data 300/1200S

Penril Corp.'s Data Communications Division has announced an AT&T 212A-compatible modem designed with automatic callback as a security feature.

The Auto Data 300/1200S reportedly answers calls, verifies user code numbers with stored information, disconnects and automatically redials the user's telephone number stored in memory.

Programming and setup can be handled by data processing personnel at the host site and can be controlled by password code, according to the vendor.

The company said the modem operates at 300 bit/sec or 1,200 bit/sec and generates tones or pulse dial signals.

Available now, it costs $650, the vendor said.

Penril Datacomm, 207 Perry Pkwy., Gaithersburg, Md. 20877.

OPTELCOM
4131; 4132; 4133

Optelcom has announced a line of full-duplex, fiber-optic modems that do not need an external power supply.

According to a company spokesman, the 4130 modem series draws power from standard RS-232 signals and provides high-speed, error-free data transmissions.

Models 4131 and 4132 are said to be capable of communicating for distances up to 2 kilometers at 50K bit/sec with premium optical-fiber cables. Model 4132, a shorter distance version, can communicate up to 60 meters at 19.2K bit/sec using a preterminated length of plastic-fiber cable.

Models 4131 and 4132 are priced at $100 and Model 4133 at $75, according to the vendor.

Optelcom, 15940 Luanne Drive, Gaithersburg, Md. 20877.

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communications managers to break down billing and management reports by system, tenant organization and extension.

The software is also said to permit tenants to share various outside line services for the most economical routing of voice and data calls.

The package is scheduled to be available in July 1985, and right-to-use fees will begin at $3,484, depending on the SL-1 model.

Northern Telecom is located at 250 Cumberland Bend, Nashville, Tenn. 37228.

LOCAL-AREA NETWORKS

INTERLAN, INC.
NT100

Interlan, Inc. has announced a transceiver designed to be compliant with the IEEE 802.3 Ethernet-like local-area network standard.

The NT100 features a nonintrusive cable tap permitting nodes to be attached or removed without disturbing communications.

An alternative tap is said to be available for those portions of the network that can be installed with preassembled coaxial cable.

Scheduled for shipments in August, the NT100 costs $250.

Interlan, 3 Lyberty Way, Westford, Mass. 01886.

DIGITAL LABORATORIES, INC.
Micro Matrix II

Digital Laboratories, Inc. has announced the addition of the Micro Matrix II to its family of automatic and manual data switches, which are used in data communications test, maintenance and diagnostic applications.

The Micro Matrix II was designed for remote monitoring and interconnection of multiple RS-232 devices under supervisory software control, the company said.

It is said to feature port-to-port connections that permit passive monitoring and signal broadcasting, according to the vendor.

Micro Matrix II is available for $995.

Digital Laboratories, 600 Pleasant St., Watertown, Mass. 02172.

AUXILIARY EQUIPMENT

ELECTRONIC SPECIALISTS, INC.
Model PDS-11/SUP

Electronic Specialists, Inc. has announced that its Kleen Line Modem protection is now available to suppress telephone and power-line spikes caused by lightning, spherics or telephone office switch gear.

The Model PDS-11/SUP is said to offer suppression on the red and green wires of a phone line and to use metal-oxide variator and gas discharge tube suppression techniques, the vendor said.

The Model PDS-11/SUP is available for $92.95.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

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The proposed charge for this latter service is $500/mo/serving office, if the conversion is between 64K bit/sec and 32K bit/sec digital signals; for analog/digital and digital/analog conversions, the charge is $900/mo/serving office.

Shannon said that any of the 44 channels can be used, at no extra charge, to transmit data at speeds of 2.4K or 4.8K bit/sec. Shannon added that, initially, each channel will have to be dedicated either to voice or data service when the customer signs up for the service.

But a customer-controlled reconfiguration option is due to be tariffed later this year; it will allow channel assignments to be changed at will through a terminal connecting the customer's site with the AT&T serving office.

Shannon said the company is also evaluating voice digitization technology that would convert an analog voice signal into a 16K bit/sec digital signal.

The 16K bit/sec service will not be available commercially for at least another year, he said, adding that AT&T is also working on an 8K bit/sec voice encoding system.

MIT from page 65

tribes that can accomplish useful things through their interconnections."

He added that the Nu Machine provides at least the equivalent computation speed found in time-shared systems while offering network communications, electronic mail, word processing and shared data bases without dependence on large remote mainframes.

UBC from page 65

tied together using any available carrier services, including those available from Isacomm and Uninet, United Telecommunications companies that provide satellite and packet-switched services, respectively.

UBC's new venture, called the United Business Network, is the generic product name given to the company's shared multitenant service. This service includes consultation, design, installation, management and maintenance of the systems installed.

Richard Kustin, manager of business planning at UBC, said that the Intecom switch will continue to be used as the foundation of the service, but that negotiations are under way for other products as well.

UBC is located at 1815 Century Blvd., Atlanta, Ga. 30345.

SYSTEMS & PERIPHERALS

Burroughs replaces B3800

Unit boosts Burroughs' CPU performance ranges

DETROIT — Burroughs Corp. has replaced its B3800 mainframe processor with the B4925. The unit was designed to enhance the performance range of the company's B2000, B3000 and B4000 mainframe systems.

Based on a 32-bit Schottkey transistor-transistor-logic CPU, the B4925 is said to use an architecture designed to accommodate both heavy batch work load and high-volume transaction processing systems. The mainframe is said to support 6M bytes of main memory, with 2.5M bytes available in the basic model and 2.5M bytes available in an add-on module.

Maximum disk storage capacity is 53G bytes, a company spokesman said. The B4925 runs on Burroughs' Mpix and MCPVI operating systems.

Other features of the B4925 include: distributed pipeline processing architecture; size that requires up to 55% less floor space and 40% less power and air conditioning than its predecessor, the B3800; support for the Share system processor for multiprocessor configuration; and compatibility with previous B2000, B3000 and B4000 systems for programs written in Cobol-74, Fortran 77, RPG-II, Basic and Pascal.

In addition, the B4925 is said to support a range of data communications alternatives, including the Burroughs CP3680 data communications system.

The B4925's performance is achieved by complementing the central processor with peripheral subsystems, multiple I/O channels and advanced front-end processors, the company said.

The B2000, B3000 and B4000 systems, including the B4925, are available in single- or multiple-CPU configurations with up to four CPUs, all of the same technology.

The vendor said the price for the B4925 is $395,000. The B4925 can be upgraded to a B4955, said to provide up to 60% increase in processing capability, for a price of $385,000.

For more information, Burroughs is located at Burroughs Place, Detroit, Mich. 48232.

System said to minimize upgrade cost

By Jeffry Beeler
CW West Coast Bureau

SUGAR LAND, Texas — A small start-up venture here has combined supermicrocomputers with a proprietary architecture to produce a 32-bit system that reportedly minimizes the cost of hardware upgrades by allowing I/O capacity and processing power to be expanded independently of each other.

With Argonne Systems, Inc.'s Tarch architecture and Multiple-Coupled Processors (MCP), user organizations that need increased execution speeds can attach additional CPUs without also being forced to add unnecessary channels.

If, on the other hand, the organizations want increased I/O capacity, the Argonne system can accommodate the desired enhancements without necessitating the installation of additional processors.

Either way, users can expand their system's processing power or I/O bandwidth without having to acquire and pay for more hardware modules than they need, according to Argonne President Henry Potts.

The Argonne product line thus contrasts sharply with conventional systems, which typically require users to upgrade both their execution rate and channel capacity, even when only one or the other needs to be increased, Potts said.

The key to the system's expansion flexibility lies in its architecture, which uses

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CDC increases Cyber memory to 128M bytes

MINNEAPOLIS — Control Data Corp. has doubled the maximum main memory available on its Cyber 205 supercomputer to 128M bytes. The move, the firm claimed, allows the Cyber 205 to be configured with the most main memory ever installed on a single computer system.

The expanded main memory represents a total of 16M 64-bit words of main memory, the firm said, which reportedly allows users of the multimillion-dollar systems to tackle larger modeling and scientific programs than before.

Previously, a Cyber 205 could be used to develop a computer model that incorporated a maximum of 50,000 grid points. Now, the company said, the Cyber 205 is capable of handling a computer model of more than a million grid points.

One advantage of the expanded main

See CDC page 79

HP announces ¼-in. tape drive as floppy backup

By John Desmond
CW Staff

PALO ALTO, Calif. — Hewlett-Packard Co. has announced the HP 9144A, a ¼-in. cartridge tape drive for use as a backup alternative to multiple floppy disk drives used on the firm's high-end microcomputers and minicomputers.

Priced at $3,500, the HP 9144A ¼-in. cartridge unit can be used on the HP 9000 Series 200 (Basic and Pascal) and HP 1000 technical systems.

Cartridges are available in 16M- and 67M-byte capacities and can be used together for 132M bytes of backup.

The 9144A is said to protect data in three ways: with read-after-write capability, said to provide automatic data verification during the write process, instead of later when data is read back; with an error

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HARD TALK
Tom Henkel
CW Senior Editor

Trilogy joins club of CPU failures

When Trilogy Ltd. bailed out of the IBM-compatible mainframe business a few weeks ago, it, by default, joined a club of mainframe-oriented vendors that have failed to deliver highly publicized systems.

IBM was the founder of this club when it dropped its Future Systems (FS) project back in the mid-1970s. While not formally announced as a product, details of the FS project were fairly well known. At the time of its demise, there were roughly 100 people working to develop a successor to IBM's 370 line of mainframes.

The idea behind the FS project was to develop a processor with amazing data base management capabilities by using an object-oriented architecture instead of the conventional file-oriented architecture, International Data Corp. (IDC) analyst Jack Hart noted.

The project was killed, Hart said, because the FS developers could not come up with a reasonable way of migrating from the 370 series architecture to the FS, a potential marketing stumbling block. Instead, IBM decided to introduce the 30 series of mainframes.

In 1979, IBM came out with the System/38, a processor which many believe employs the remnants of the FS development project. IDC's Hart noted the System/38 wound up having the problems that IBM executives feared would happen with the FS mainframe — some users have been unwilling to go through the conversion process to take advantage of the the System/38's benefits.

A charter member of the club is Burroughs Corp., which dumped its Parallel Elements of Processing supercomputer weeks after W. Michael Blumenthal took over the reins of the company. Burroughs had already announced and had taken at least two orders for the system when the project was killed.

In a recent interview, Blumenthal said he ordered the supercomputer project stopped because he felt the research and development efforts behind such a project were far too high for the potential gains.

Two more recent inductees to the club are both IBM plug-compatible manufacturers, Storage Technology Corp. (STC) and Amdahl Corp.

About a year ago, STC was seriously talking about developing a line of Cmos-based IBM-compatible mainframes that, according to a confidential private placement memo issued by Smith Barney Harris Upham Co. June 29, 1983, offered performance ranging from about two to 14 million instruction/sec.

The systems were supposed to be introduced to the market in 1984. But STC decided to drop the project, presumably because it realized the proposed processor line could not top the IBM price/performance ratio.

Back in 1980, Amdahl Corp. amazed industry watchers when it managed to

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INSIDE

DEC's Tempest Pro-350 designed to meet Defense security specs

MAYNARD, Mass. — Digital Equipment Corp. has recently introduced a version of its Professional 350 minicomputer designed to meet U.S. Department of Defense radio frequency interference security, or Tempest, specifications.

The Tempest Pro-350 reportedly can function as a stand-alone desktop minicomputer and can link to the vendor's 32-bit VAX-11/751 computer, a spokesman for the company reported.

The Tempest Pro-350 is a member of the vendor's PDP-11 computer line and runs an enhanced version of DEC's RSX-11M operating system, the spokesman said.

The Tempest Pro-350 is based on a 16-bit PDP-11 minicomputer chip and comes with a standard 512K bytes of main memory and a floating-point processor.

It also uses a DEC RX50 5¼-in. diskette subsystem with a dual diskette drive for a total of 800K bytes of storage per drive, the spokesman said.

The Tempest Pro-350 is priced at $8,995 and will be available in October.

Digital Equipment is headquartered at 146 Main St., Maynard, Mass. 01754.

Via unveils graphics system

NORTH BILLERICA, Mass. — Via Systems, Inc. has announced Systemnode 150, an interactive computer graphics system for integrated-circuit and very large-scale integration design and mask making.

The product reportedly features interactive graphics data entry, pattern generator data preparation, design rule check, plotting, data file management, a macro programming language and virtual terminal operation.

The system includes a Digital Equipment Corp. VAX-11/73 central processor, a 330M-byte Winchester hard disk drive, an 800 or 1,600 bit/in. tape drive that uses ½-in. tapes, a color graphics display with two Motorola, Inc. 68000 microprocessors, an alphanumeric terminal and Via's design software tool kit, Via said. The tool kit reportedly includes the vendor's Chiptool, used for integrated-circuit layout design; Ruletool, for design rule checking; and Retool, for data base conversion.

Systemnode 150 can enter, edit and output data to any optical or electron-beam pattern generator, according to the vendor. It features networking facilities that interface with other systems and software, Via said.

Systemnode 150 costs $159,500.

Via Systems is located at 76 Treble Cove Road, North Billerica, Mass. 01862.

DEC-based I/O processor out

CLARK, N.J. — Ultimate Corp. announced a Digital Equipment Corp. LSI-11-based I/O processor that reportedly allows the firm's Ultimate peripheral processor to be used solely for executing the Ultimate instruction set. The Model 2020 runs concurrent on-line, batch and time-sharing applications.

The Model 2020, which runs under Ultimate's Pick & Associates, Inc.-compatible operating system, can serve as a stand-alone processor with a network of on-line terminals for transaction processing, data base management and time-sharing requirements.

The basic configuration is 512K bytes of on-board memory with a dual-ported peripheral processor, 33M-byte disk, ¼-in. tape drive, seven open ports and a port for a serial printer.

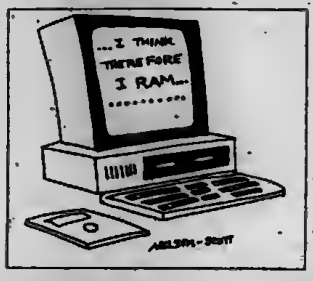
The price of the basic Model 2020 is $45,000.

Ultimate also released what it described as its first computer system running under its Pick-compatible operating system that has a customer-assisted maintenance program, which reportedly allows users to obtain and replace parts, since the CPU, peripherals and power supply are individually enclosed, replaceable units.

The Model 1500's basic configuration contains 256K bytes of memory, 19M-byte disk, ¼-in. cartridge tape drive, seven open ports and a serial printer. The Model 1500's expansion model is the Model 1510.

The price of the basic configuration of Model 1500 is $27,500, and maintenance charges are $95/mo.

Ultimate is located at 77 Brant Ave., Clark, N.J. 07066.



In 1947, 71 years after Alexander Graham Bell uttered
the words "Watson, come here, I want you...," Bell Laboratories
invented the transistor...and ushered in the Computer Age.

WATSON, WATCH US NOW!

AT&T INTRODUCES TH

For over 40 years, AT&T has been in the business of designing and manufacturing computers.

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Today, we're proud to introduce a whole new line of flexible, compatible, reliable computers for business... AT&T Computers.

THE FLEXIBLE FAMILY

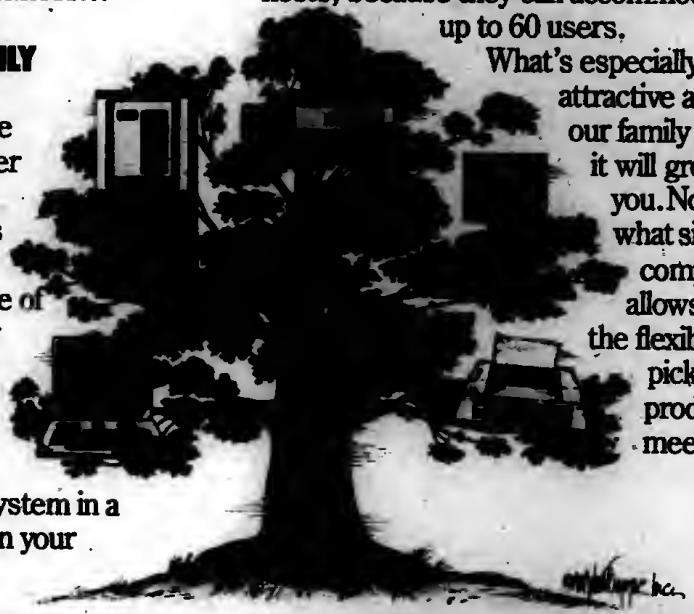
Meet the family.

The 3B2, 3B5 and the AT&T Personal Computer make up the new AT&T family of flexible business computers.

The AT&T 3B2 is one of the most advanced super microcomputers you can buy today. This 32-bit UNIX* System V-based super micro packs all the power of a much larger system in a size small enough to sit on your desk top. Because it's a multi-user, multi-tasking computer that can accommodate up to 18 terminals, it operates at a low cost per work station. That makes it perfect for offices where many people need desk-top computers and there's a need to accommodate growth.

For larger family gatherings, the AT&T 3B5 minicomputers make great hosts, because they can accommodate up to 60 users.

What's especially attractive about our family is that it will grow with you. No matter what size your company, it allows you the flexibility to pick specific products to meet your



E NEW COMPUTERS.

needs today. Without the threat of obsolescence tomorrow. And the family's open architecture means that our computers will be good company for your current hardware and software, thus protecting your investment.

No matter which AT&T Computer you buy, consider yourself part of the family.

ALL THIS AND A PC TOO

AT&T would also like you to meet the new AT&T Personal Computer. This exciting new member of our computer clan is perhaps the most flexible and compatible personal computer on the market today.

What makes the AT&T Personal Computer special is its ability to run most popular business software, including most available MS-DOS** applications. It operates as a stand-alone unit or as an intelligent work station in an integrated computer network. And it combines high performance with excellent graphics capabilities and a high-resolution screen.

Moreover, costly options on some other PC's are standard features on the AT&T Personal Computer—features such as color graphics; serial and parallel ports; clock/calendar display; monitor pan and tilt, plus multiple expansion slots to add extra printers, memory and other plug-in options. All this is bound to make it your personal favorite.

YES, WE DO WINDOWS

If you have several stacks of work that you'd like to spread out and work on, AT&T has the perfect way out. It's called windowing. It allows you to divide your computer screen into four miniscreens. It enables you to print from one window, edit in another, draw a graph in a third and sort addresses in the fourth. With AT&T's windowing, you'll

THEY GET ALONG

be able to see to everything at once.

When it comes to compatibility, the new AT&T Computers hit it off with each other...and most everyone else.

To begin with, our unique PC Interface bridges the MS-DOS and UNIX Operating Systems, allowing you to use your PC as part of a larger 3B network.

All our computers are based on AT&T's Information Systems Architecture, an open, communications-based structure that can accommodate and integrate not only our products, but also those of other manufacturers.

We also have the UNIX System V Operating System, developed by AT&T Bell Laboratories. It's an operating system so flexible, it's rapidly becoming an industry standard. You won't have to discard equipment. Or waste time and money reprogramming your software every time a new computer comes along.

HARDWORKING SOFTWARE

For solutions to all your business problems, the new AT&T software really applies itself with a wide range of new applications. AT&T software also offers you upward compatibility. Because it's based on the UNIX Operating System, 3B2 software will run on 3B5 computers.

UNIX

It's your assurance that your software investment is protected as you grow.

We've created a Business Management Series to perform a full range of management functions from financial analysis to sales administration. The Communications Series enables your processors and terminals to talk with each other. There's an Industry Series to zero in on the needs of your particular business. There's also an Office Productivity Series to help you with tasks like word processing, filing, and spreadsheets. And a Sys-

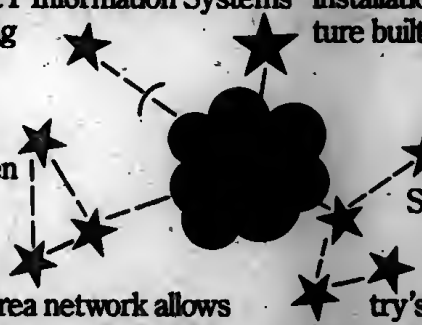
MS DOS

...FAMOUSLY.

tems Programming Series will help you create new programs quickly and easily. Since this is just a sampling of our wares, you can see why it makes sense to sign on with AT&T's entire range of software.

WE'LL MAKE YOU A STAR

The new AT&T Information Systems Network, featuring star topology, is one of the most flexible, cost-efficient links between terminals, work stations, and computers of all sizes. This local area network allows you to connect departments, whole buildings, industrial parks...or even campuses.



Information Systems Network also gives you fast response time and centralized administration and control. In addition it offers collision-free access, making it ideal for large user populations. Information Systems Network will do more than help your company keep pace with today's competitive marketplace. It will change the way you think about local area networks.

BUILT-IN RELIABILITY PLUS SERVICE

AT&T Computers meet the toughest design standards and rigorous testing procedures. Their rugged design can adapt to any office environment without complicated powering, air conditioning or installation requirements. And they feature built-in diagnostics to find problems—and fix them—in record time.

In case you do require service, AT&T Information Systems personnel are out in force. With around-the-clock service, and one of the industry's largest service forces, including thousands of skilled technicians in over 1400 locations.

Few companies can offer you this kind of built-in reliability plus service.

So come in and meet the family: the 3B2, 3B5 and the AT&T Personal Computer. For more information call your AT&T Account Executive or 1 (800) 247-1212.

AT&T INFORMATION SYSTEMS: WHEN YOU'VE GOT TO BE RIGHT.

AT&T

Symbolics adds Model 3640 to workstation line

CAMBRIDGE, Mass. — Symbolics, Inc. has added the Model 3640 to its Symbolics 3600 family of workstations. The units can be used in a networked software engineering environment.

The Symbolics 3640 workstation was designed for use by software developers working in areas such as artificial intelligence, expert systems and very large-scale integration design.

The standard configuration includes 2M bytes of main memory, a 140M-byte Winchester disk drive, four backplane expansion slots and a 1,100- by 900-pixel, bit-mapped black-and-white display console. Pipelined video memory and phase-encoded digitized video output reportedly allow the console to be located up to 1,000 feet from the processor.

Hardware options reportedly include a single precision floating-point accelerator, memory expansion up to 8M bytes, a cartridge tape drive, a 1,200/2,400 bit/sec modem and an 8-bit color graphics console.

The 3640 features the Symbolics Zetalisp operating environment and software options.

The standard configuration costs $69,000/workstation. When sold in groups of four, the workstations cost $59,000 each.

More information is available from Symbolics at Four Cambridge Center, Cambridge, Mass. 02142.

TURNKEY SYSTEMS

DY-4 SYSTEMS, INC. DSM-6816

DY-4 Systems, Inc. has announced the DSM-6816, a Unix-based VME-bus development system based on the Motorola, Inc. 68000 microprocessor and 68451 Memory Management Unit.

Features include 78K bytes of random-access memory, expandable to 3.8M bytes; a 20M-byte hard disk; a 1.2M-byte, 8-in. floppy disk drive; two serial user console channels; a serial printer port; an intelligent disk/printer controller; and six spare card slots.

The Unisoft System Corp. Uniplus Unix implementation provided with the DSM-6816 is said to include all features of Bell Laboratories' Unix in addition to many University of California at Berkeley Unix enhancements. The Source Code Control System is a collection of utilities that tracks source code and documentation through the product development cycle.

Software options for the DSM-6816 include a Fortran 77 compiler and Ryan-McFarland Corp.'s RM/Cobol compiler, a Pascal compiler and a 68000 Macro Assembler using Motorola mnemonics. Two programmable read-only memory-based monitor programs are provided with the DSM-6816, the vendor said. Software can be developed for a variety of applications, including commercial and military air traffic control, industrial process control, numerical machine control, computer-aided design and manufacturing, speech synthesis and robotics, according to the vendor.

The DSM-6816 system is priced at $16,575, the vendor said.

DY-4 Systems, Suite 202, 1475 S. Bascom Ave., Campbell, Calif. 95008.

COMPUTERS IN MEDICINE, INC. Pulse

Computers in Medicine, Inc. has introduced its first product, an integrated information management system for medical groups.

Pulse was designed to allow physicians to use a single system to perform medical tasks, such as displaying color graphs of a patient's blood pressure, weight and medications. It also displays a physician's appointment calendar or charts the group's financial performance.

The system is based on a Digital Equipment Corp. PDP-11 minicomputer and the DEC Rainbow personal computer. Features are said to include touch-screen terminals, color graphics, integration of Lotus Develop-

ment Corp.'s 1-2-3, Microsystems Engineering Corp.'s Mass-11 word processing and special-purpose medical applications such as drug-interaction checks and Computers in Medicine's Clinical Management Graphics. Also available is Computers in Medicine's Medtalk, an optional voice-synthesis feature designed to read information from patient records to authorized physicians who dial in from touch-tone telephones, according to the vendor.

The Pulse 1000, a system designed for a medium-size group practice, includes a PDP-11, a Rainbow, a graphics terminal and a touch-screen terminal.

It costs $70,000 or can be leased for about $1,500 per month, according to the vendor.

Computers in Medicine, 124 Mt. Auburn St., Cambridge, Mass. 02138.

DATA STORAGE

BABER, INC.
Multidisk Reader

Baber, Inc. has introduced a floppy disk reader that reportedly transfers data from a variety of incompatible word processors, personal computers and typesetting units to a host device.

The Baber Multidisk Reader is said to be capable of reading more than 40 different disk formats and transmitting the data to RS-232C-compatible devices. It reportedly also eliminates the need for rekeyboarding and conversion services.

The Multidisk Reader is priced from $9,995.

Baber, Unit B-1, 3 Northern Blvd., Amherst, N.H. 03031.

HP from page 71

correction method that uses data redundancy to improve data reliability; and with a built-in media monitor, said to protect data integrity by flashing a light when a tape needs to be replaced.

The drive also has the ability to reconstruct corrupted data, according to the company.

The 9144A is said to allow the user to back up a 60M-byte disk in 30 minutes. System software and a 12K-byte buffer in the drive are said to provide 2M byte/min backup performance. Reliability is said to be enhanced by a servo-control feature that increases tape and drive motor life.

More information is available from HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

CDC from page 71

memory is that users who create large system models can either develop larger models or incorporate more details into an existing model. This, according to CDC's vice-president of computer systems, Larry E. Jodeaus, allows users to reduce the number of expensive crash and wind tunnel tests often used in designing products like automobiles and aircraft.

For example, CDC said the expanded main memory could allow an auto maker to simulate a crash test on the back half of an automobile model.

A Cyber 205 supercomputer equipped with the expanded 128M bytes of main memory costs between $18 million and $21 million, CDC said from 8100 34th Ave. S., Minneapolis, Minn. 55440.

ARGONNE from page 71

Intel Corp.'s Multibus II to connect a configuration's constituent processors. Operating alongside the systems bus is Argonne's own proprietary Phastbus, which reportedly serves as a dedicated 13.6M byte/sec pipeline between CPUs and their internal memory.

Potts credits the 32-bit asynchronous bus with cutting the data traffic along Multibus II by 60% to 70%. Phastbus also comes with a Q-bus adapter that allows the Argonne system's storage control processors to support disk and tape modules, he said.

Among its other capabilities, Tarch allows up to eight 16- and 32-bit processors to share peripherals and to plug into the same backplane and enclosure.

Depending on the number and type of processors, an Argonne system can execute 0.8 million to 10 million instructions per second, according to a company source.

At the outset, Argonne's MCP series of CPUs will consist of just one model — a supermicro that uses DEC's 15 MHz J-11 microprocessor and provides 80% of the performance of a PDP-11/70, Potts said.

Early next year, however, Argonne will expand the MCP line to include additional models, including a Unix-based processor that will fall into the same performance class as DEC's VAX series, Potts said.

Prices of the Argonne system, which becomes available for shipment in October, start at about $11,000.

Argonne is headquartered at 525 Julie Rivers Road, Sugar Land, Texas 77478.

TRILOGY from page 71

counter IBM's 3081 processor announcement with its own 5860 and 5880 processors. There were problems with the 5860 which caused Amdahl to delay delivering the system. Amdahl finally did start delivering its 5860 and 5880 products, but according to Hart, the 5860 was virtually redesigned.

Perhaps the moral of the story is that many successful companies have electronic ghosts rattling in their corporate closets. The mainframe business is certainly a high-risk venture, one which seems to force even the best companies to make occasional mistakes.

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MICROCOMPUTERS

MIS managers cautioned to look before they link

By Paul Korzeniowski
CW Staff

FRAMINGHAM, Mass. — Integrating personal computer and mainframe data bases represents a significant challenge to MIS directors, Martin Levin, a Colorado Springs consultant, claimed at a seminar held here last month.

Proper integration gives significant productivity enhancements, but improper connections yield redundant and antithetical results, Levin said at the Personal Computers in the Corporate Data Base seminar, sponsored by the American Institute for Professional Education.

"We are in a period of personal computer intoxication," Levin said. "Managers believe that as long as someone uses [Lotus Development Corp.'s] 1-2-3, his results are accurate. The 'garbage in, gospel out' credo is practiced with personal computer output: Managers have confidence in 1-2-3 results, but they never ask to look at the spreadsheet logic that produced the output."

The consultant noted that results based on extracts of mainframe data bases are more susceptible to incorrect conclusions than data created by one person. "Managers can produce the Tower of Babel effect," Levin said. "Each one may extract data in a slightly different manner. Then they all plug it into their personal computers, resulting in conflicting conclusions based on seemingly common data."

The tendency to share data can also muddle results, Levin said.

See INTEGRATE page 94

Seminar attendees also urged to avoid vendor-specific links

By Paul Korzeniowski
CW Staff

FRAMINGHAM, Mass. — MIS managers should stay away from microcomputer-to-mainframe links that are limited to a single vendor's packages. Instead, they should incorporate links that provide access to a number of popular programs.

Martin Levin, a consultant based in Colorado Springs, made that recommendation here last month at Personal Computers in the Corporate Data Base, a seminar sponsored by the American Institute for Professional Education.

"There are a number of links today that do not allow a user to move data among different programs," Levin said. "To use these packages, customers have to throw away current packages such as [Lotus Development Corp.'s] 1-2-3 and use the vendors' packages, which are not as good as popular packages."

Levin listed three methods that mainframe software companies are employing to link their products to personal computer data: write-down, buy up and handshake.

A write-down represents a mainframe package that has been tailored to a microcomputer, Levin said. For example, Information Builders, Inc.'s Focus, a fourth-generation query language, offers a microcomputer version, PC/Focus. Write-down programs possess many of the key features that their mainframe counterparts have, including the same file structures and similiar commands, Levin noted.

See LINKS page 94

INSIDE

Trade show demos served up fast; queasy feeling lingers

SMALL TALK
Paul Korzeniowski
CW Staff

Demonstrations at trade shows resemble lunch at fast-food joints: They are served quickly for hungry customers and leave an uneasy feeling in one's stomach.

This uneasy feeling simmers as the viewer realizes that although he has spent up to an hour viewing a product, he does not really know much about it.

During that time, he is bombarded with so much hype that he often loses his ability to judge a product's features. He asks about record locking, file sorting and storage capacity; the vendor answers with talk about power and revolutionary advances and a lot of other noise.

The only thing the viewer learns is how quickly a demonstrator can manipulate a keyboard. Screen after screen flies by, sending the viewer only a subliminal message: "This package is easy to use."

During a demonstration of Lotus Development Corp.'s Symphony at Comdex/Spring '84, screens passed by so quickly that the demonstrator had to backtrack three times because two experienced users of Lotus' 1-2-3 could not keep pace with those magic fingers.

One reason the screens move so quickly is that the illustrator has completed the demonstration so many times that its complex commands have become second nature. Ease-of-use limitations become evident when another employee who is not as familiar with the product is forced to demonstrate it.

Another reason for the flying screens is that any pause might allow the viewer to ask a question. Since questions are not part of the demonstration, the illustrator often has difficulty with them.

Questions raise problems, one being that the demonstrator usually does not use the product in his own work. He knows the demonstration command sequence; hitting a given command produces a predefined screen. But his perceptions of how the product can be used, its functions and its features are relatively vague. When the viewer's questions stray from this constrained script, the demonstrator is lost.

See DEMOS page 93

MICRO BITS/THOMAS W. MADRON

Just a reminder: Data is priceless

I sat enchanted one evening last spring as I listened to Commodore Grace Murray Hopper, who is one of the oldest persons on active duty with the U.S. Navy, the "third programmer on the first computer" (in her words) and one of the original authors of Cobol.

Hopper always manages to provide some thought-provoking suggestions, and that night she talked about determining the value of information.

She made the point that information professionals frequently have emphasized information processing to the exclusion of an understanding of the information's worth. She gave the computer professionals in attendance an assignment to write a paragraph on the value of information, and this is my response.

With the deployment of microcomputers as workstations in large organizations, the issue of the value of information is becoming clearer. Micros will be catalysts for this issue because one of the primary reasons people want micro-based workstations is to be able to download subsets of organizational data for local processing, analysis and

See VALUE page 94

Madron is manager of computer services at North Texas State University, Denton, Texas.

Retailer uses integration as tactic to battle data flow bottleneck

MINNEAPOLIS — Faced with major bottlenecks in its information flow, one of the Midwest's biggest department stores has embarked on an integrated systems approach linking its central processor with in-store microcomputers and point-of-sale (POS) terminals.

Starting this month, County Seat Stores will begin planning the installation of some 150 Fujitsu Microelectronics, Inc. Micro 16S personal computers and 800 Fujitsu 7680 POS terminals in its 272 branch stores. Programmer training for the new system begins this month, with the first systems due to be shipped in September, the company said.

Max Harris, County Seat's senior vice-president of administration, said the objective of the $4 million system, scheduled to be completed in 1986, is to place the branch stores online to the company's IBM 3083 central processor.

"We are going to install a personal computer in the back room of our store that will run the point-of-sale terminals at the front of the store and hook them up to our host computer," Harris said.

For a long time, the company has been forced to keep its branch store data in its central MIS department because the stores had no computers capable of transmitting, retaining and retrieving information, Harris explained.

"POS devices on their own do not have enough capacity to keep all the personnel, inventory and materials records at the stores, and so we have been forced to keep that information

See TACTIC page 93

Making multi-vendor office systems work together requires just one thing.

Soft-Switch.™

The idea seems simple enough: connect all of your office systems so that documents can be freely interchanged for editing, storage, display, and printing. That includes word processors, PCs running word processing packages, and mainframe terminals accessing DCF and PROFS.

Many vendors claim to connect multiple vendors' equipment through "protocol translation." And connect they can, but not communicate. To really communicate requires transforming the document coding so that it is fully editable at the receiving system.

Soft-Switch is compatibility

ITI's Soft-Switch is a program product for your IBM mainframe (MVS or VM) that allows users to send documents to other users with document translation performed automatically, to store documents in host libraries, and to retrieve documents from these libraries.

Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF and with PROFS; with the IBM 6670 laser printer, and with standard hard copy printers.

Soft-Switch is totally consistent with evolving standards for office systems. In fact, Soft-Switch integrates multi-vendor office environments by first translating a document into IBM's level 3 Document Content Architecture (DCA), and then into the exact format required by the receiving workstation.

Soft-Switch solves today's problems

Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (which executes in the PC, as well as in the IBM host) and specifies distribution to his secretary's Wang word processor and to the 6670 laser printer down the hall. Soft-Switch provides the micro/mainframe link, transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer OCL format, and routes the documents to their final destinations.

Soft-Switch: a path to tomorrow

Already installed at many FORTUNE 100 companies, Soft-Switch integrates the technologies of protocol translators, text management systems, micro/mainframe links, message switches, and electronic mail systems to provide organizations with integrated office systems.

It's a product you need today, and will, no doubt, need even more tomorrow. To learn more about how Soft-Switch will make your multi-vendor office systems work together, just mail the coupon, or call TOLL FREE

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Powerbase Systems announces several upgrades to its DBMS

NEW YORK — Powerbase Systems, Inc. has announced several enhancements to Powerbase, its data base management system for IBM Personal Computers with IBM's PC-DOS operating system.

Powerbase's Report Writer now can create reports with information from several files linked by the product's Datazoom feature, Powerbase said. The user can also specify five key sort fields from the report's multiple files.

Powerlinks, a transfer facility, reportedly lets the user transfer files between Powerbase and Data Interchange Format programs; Lotus Development Corp.'s 1-2-3; Micropro International, Inc.'s Wordstar; Ashton-Tate's Dbase II; Microsoft Corp.'s Multiplan; Software Publishing Corp.'s PFS:file and PFS:report programs; and Multimate International, Inc.'s Multimate.

Mailing list generator capabilities produce custom labels designed on the user's screen. The new capability provides the user with nine 75 character lines for each label.

A global replace feature allows the user to replace any type of stored field with a constant or a calculated value and updates related records, while a global recalculation feature is designed for any calculated, look-up and function field whose values are stored, the company said.

Powerbase costs $395. Current users will receive automatically the upgraded package, the vendor said.

Powerbase Systems is located at 12 W. 37th St., New York, N.Y. 10018.

Wang inks PC/Focus agreement

LOWELL, Mass. — Wang Laboratories, Inc. and Information Builders, Inc. have recently signed an agreement under which Wang will market Information Builder's PC/Focus software for the Wang Professional Computer.

PC/Focus will permit Wang Professional users to develop sophisticated data base applications in both stand-alone and distributed data processing configurations.

The package reportedly is composed of three main elements: a relational data base management system, the fourth-generation Focus programming language and utilities for report writing and data analysis.

In mainframe Focus environments, PC/Focus enables users to process data extracted from mainframe files and to send data and procedures to the mainframe for update or execution, Wang said.

Focus data security is said to protect data at four levels and to offer encryption capabilities.

Donald Marshall, Wang's director of software marketing, estimated that there are more than 75,000 end users of mainframe Focus software.

PC/Focus for the Wang Professional operates under Microsoft Corp.'s MS-DOS operating system and carries a one-time license fee of $1,595.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.

Empress DBMS introduced for Motorola

LITTLETON, Mass. — Empress Technology, Inc. has introduced the Empress relational data base management system for Motorola, Inc.'s 68000-based systems.

Designed to provide powerful ad hoc reports, Empress is "very similar in function to some of the fancy [mainframe] report writers, such as [D&B Computing Service's] Nomad, [Information Builders, Inc.'s] Focus and [Mathematica Products Group, Inc.'s] Ramis," President Jim Steuert claimed.

Empress can manage an unlimited number of records and sort 1,000 records per second, Steuert said. Internal calculations reportedly are done with 18-digit accuracy with decimal precision.

An interactive report writer responds to simple commands. More complex ad hoc queries are accomplished using key word commands with modifiers describing fields that are named and formatted by users, either as they initially set up the file or determine the display format.

Empress is designed for 68000-based systems with a minimum of 256K bytes of random-access memory (RAM). "You need the power of the 68000 to do complex reports," Steuert maintained. "I don't think people understand the immense difference between the 68000 and the [IBM Personal Computer] environments."

The package currently is available at $400 for the Radio Shack Corp. TRS80 Model 16 running Radio Shack's TRSDOS or Microsoft Corp.'s Xenix operating systems.

Versions for the Apple Computer, Inc. Lisa 2 and Macintosh, equipped with 512K bytes of RAM, are scheduled for September delivery.

Empress Technology is located at 510 King St., Littleton, Mass. 01460.

out of your UN

capability to divide the display into six
use of UNIX System V resources to
and control the size and position
electronic "Mouse." Unmodified host programs then view
as separate terminals, making it possible for you to work on
several things at once.

Just think how much easier that'd make it for you to prepare documents and graphics, do computer aided engineering or write and debug programs. Imagine, for example, while a program is compiling in one window, you edit the
in a second window, check
window, and send and receive
in a fourth window.

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SOFTWARE

LIFEBOAT ASSOCIATES, INC.
Lattice Windows

Lifeboat Associates, Inc. has introduced Lattice Windows software for creating software programs using multiple, on-screen windows.

Lattice Windows reportedly permits programmers to think in terms of logical or virtual screens, instead of the single physical screen. It is said to define up to 255 windows, each of which can be independently written to or read from, even if the window is not currently visible on the screen.

Lattice Window's subroutines reportedly open the window automatically, write text within it, process input from the keyboard and close the window. The program can define the size, shape, color, border, position and priority of the window and cause it to move, shrink or grow, Lifeboat said.

The package is written in 8086 assembly language for the IBM Personal Computer and compatibles and is priced at $295.

Lifeboat Associates, Department C, 1651 Third Ave., New York, N.Y. 10128

TELOS CORP.
Filevision

Telos Corp. announced a filing and object-oriented drawing system for Apple Computer, Inc.'s Macintosh. Filevision was designed for computer novices as well as for more sophisticated users, according to Telos.

Filevision reportedly can display information about an object in a picture on the Macintosh's video screen with a click of the mouse. Groups of objects from a drawing that have common characteristics can be selected for study, the vendor said. Drawings with highlighted information or selected information can also be shown, according to Telos.

The price of the Filevision package is $195, the vendor said.

Telos, 3420 Ocean Park Blvd., Santa Monica, Calif. 90405.

KEY SOLUTIONS, INC.
Databurst LSP

Key Solutions, Inc. has introduced a language support package for its Databurst software that provides an interface for C language applications developers on the IBM Personal Computer.

The Databurst Language Support Package (LSP) reportedly generates C source programs, which use the Databurst runtime screen processor to manage all screen and keyboard operations during program execution.

The LSP also simplifies the integration of a full system of programs and speeds the development and modification of interactive programs on the IBM Personal Computer, Key Solutions said.

In addition, the LSP produces all functions as source code, according to the vendor.

The LSP is priced at $40.

Key Solutions, P.O. Box 2297, Santa Clara, Calif. 95055.

SOFTWARE CONNECTIONS, INC.
Datastore:Report

Software Connections, Inc. has introduced Datastore:Report, a report writer for use with the company's LAN:Datastore data base management system.

Datastore:Report is said to offer menu-driven report designing, prompts and function keys. The product also reportedly provides arithmetic, formatting and printing functions and can retrieve data from multiple files.

Formatting can be performed on titles, column headings, footings and fields, according to Software Connections. The package also is said to offer underlining, emphasizing pitch and double striking among its print features.

The product is able to incorporate data into reports from up to 16 data bases, the vendor said.

Datastore:Report is priced at $195

Continued on page 88

IBM micro running PC-IX gets link

LOS ANGELES — Cipherlink Corp. has announced Any, a communications link between an IBM Personal Computer XT running IBM's PC-IX operating system and a variety of other systems.

Any automates the procedure for capturing screen data from one system and transmitting it to another, Cipherlink said. After a user defines the records and fields he wishes to transfer, the system chooses those records and and transfers them from one system to the other.

Because Any captures screens of data, it can transfer only data accessed by terminal emulation. The IBM Personal Computer XT PC-IX version of Any is equipped with six types of terminal ports that allow it to access other systems.

There are no constraints on how many screens data can be taken from, a spokesman said. However, he said, logical constraints would probably discourage a user from capturing more than a few screens at a time.

The first Any system consists of an IBM Personal Computer XT with the PC-IX operating system and Any software. It costs $15,000: An additional Any interface card, which handles functions such as data encryption, correction or error lines and remote connection, costs $795.

Cipherlink is located at the 9th Floor, 3807 Wilshire Blvd., Los Angeles, Calif. 90010.

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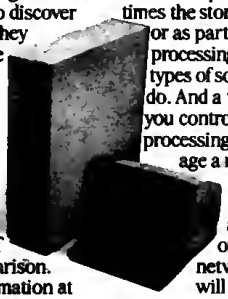

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Compare the Tower with a personal computer like the IBM XT and you'll find there's no comparison.

The Tower processes information at twice the speed. It comes with over four times the storage capacity. It can stand alone or as part of a large distributed data processing network. It runs all the different types of software that personal computers do. And a whole lot more. They can help you control inventory better. Run a data processing department better. Even manage a nationwide network of hospitals or auto parts stores better.

In short, whether you run a small business, a department of a large business or a nationwide network of businesses, the Tower will help you do business better.

Why does the Tower perform so well? Because it's built so well.

It is powered by the Motorola 68000, one of the most powerful 16-bit microprocessors around. It comes with other guarantees of high performance like a Winchester hard disk and the Intel Multibus.* And it offers you a choice of two operating systems—RM/COS and UNIX.* So it's simple enough for vice-presidents (just plug it in and go) or sophisticated enough for techies (you can do your own thing).

WHEN PERSONAL COMPUTERS AREN'T EXPANDABLE ENOUGH.

Any small business computer will grow as you grow. The question is, how far?

The Tower's storage capacity expands

SONAL COMPUTER
T ENOUGH.

from 40 million characters to 214 million. Translated, that means it will hold anywhere from 13,000 to 71,000 pages of text (it's not for short story writers) or from 260,000 to 1,420,000 names and addresses (you'd better have plenty of friends).

Even more important, up to twelve people can work on the Tower at once with additional work stations. On different projects. Or the same project.

WHEN PERSONAL COMPUTERS AREN'T ECONOMICAL ENOUGH.

Of course, you may save money in the short run by investing in a personal computer. But if it can't do everything you want it to, it could really cost you in the long run.

What's more, the Tower becomes more economical as you add more work stations. With eight work stations, for example, it ranges from $25,000 to $36,000. Eight IBM XT's, on the other hand, will cost you $45,000. Networking them all together would set you back even more. And you still wouldn't have anywhere near the power of the Tower.

Quite simply, the Tower gives you something no single personal computer or group of personal computers can: enough power, expandability and economy to handle your business problems. Put another way, the Tower is a computer you can grow into, not out of. No other machine on the market offers everything it does at the price it does.

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MICROCOMPUTERS

Continued from page 88

and runs on IBM's Personal Computer and compatibles; Texas Instruments, Inc.'s Professional; and NCR Corp.'s Decisionmate personal computer. It also operates in all local-area networks, the vendor said.

Software Connections, 2041 Mission College Blvd., Santa Clara, Calif. 95054.

CONTROL DATA CORP.
PFA Micro

Control Data Corp. has introduced PFA Micro, a software product said to provide automated process flow analysis that uses flow charts to analyze repetitive operations.

PFA Micro, for use on the IBM Personal Computer, reportedly cuts documentation time by 50% over manual systems and automatically generates nine different reports to identify areas where processes can be improved.

Input for PFA Micro consists of a process summary statement, a description of the process under study, a functional chart and a description of the steps in the process.

PFA Micro consists of a facilitator's kit, priced at $950; a training module, priced at $450; and application software, priced at $950.

Control Data, 8100 34th Ave. South, P.O. Box O, Minneapolis, Minn. 55417.

BMDP STATISTICAL SOFTWARE, INC.
21 statistical programs

BMDP Statistical Software, Inc. has announced that 21 of its mainframe statistical software programs are now available for the IBM Personal Computer.

The programs reportedly feature general descriptive statistics, regression, factor, survival and cluster analysis and analysis of variance and nonlinear regression.

Minimum requirements for running BMDP on the IBM microcomputer include a 5M-byte hard disk, double-sided and double-density floppy diskette capacity, an Intel Corp. 8087 floating-point processor, IBM PC-DOS 2.0 or higher and 640K bytes of memory.

Two groups of six BMDP programs are being distributed at a cost of $450 for the first group and $200 for the second when purchased together. Additional programs cost $50 each.

BMDP Statistical Software, 1964 Westwood Blvd., Los Angeles, Calif. 90025.

FUJITSU MICROELECTRONICS, INC.
Wordstar for Micro 16S

Fujitsu Microelectronics, Inc. has announced that Micropro International Corp.'s Wordstar word processing program is now available for Fujitsu's Micro 16S series.

Wordstar is offered to Micro 16S users in both the Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M 86 formats.

Price of the Wordstar package is $350 for either operating system.

Fujitsu Microelectronics, 3320 Scott Blvd., Santa Clara, Calif. 95051.

BORLAND INTERNATIONAL
Sidekick

Borland International has introduced Sidekick, a template for programs that run on the IBM Personal Computer with IBM's PC-DOS operating system.

Sidekick features an appointment calendar, calculator with business and scientific functions, automatic telephone dialing, a full screen editor and an Ascii conversion table, Borland said.

Sidekick, a menu-driven package, opens a window for each function and allows data to be passed between windows, Borland said.

The program is said to take up 20K bytes of random-access memory and to work in conjunction with programs such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II.

Sidekick sells for $49.95.

Borland International, 4113 Scotts Valley Drive, Scotts Valley, Calif.

LATTICE, INC.
Version 2.12 of C compiler

Lattice, Inc. has announced Version 2.12 of its C compiler for the IBM Personal Computer and other microcomputers using Microsoft Corp.'s MS-DOS operating system.

Version 2.12 is said to allow access to the full address space of the Intel Corp. 8086/8088 microprocessors.

Other features reportedly include: I/O functions that determine at runtime which version of MS-DOS is present; library routines that perform floating-point arithmetic and determine at runtime if the 8087 is present; a full set of mathematical functions; and library functions that allow programs under MS-DOS 2 to load another program with control returning to the original program after execution.

Version 2.12 is priced at $500.

Lattice, P.O. Box 3072, Glen Ellyn, Ill. 60138.

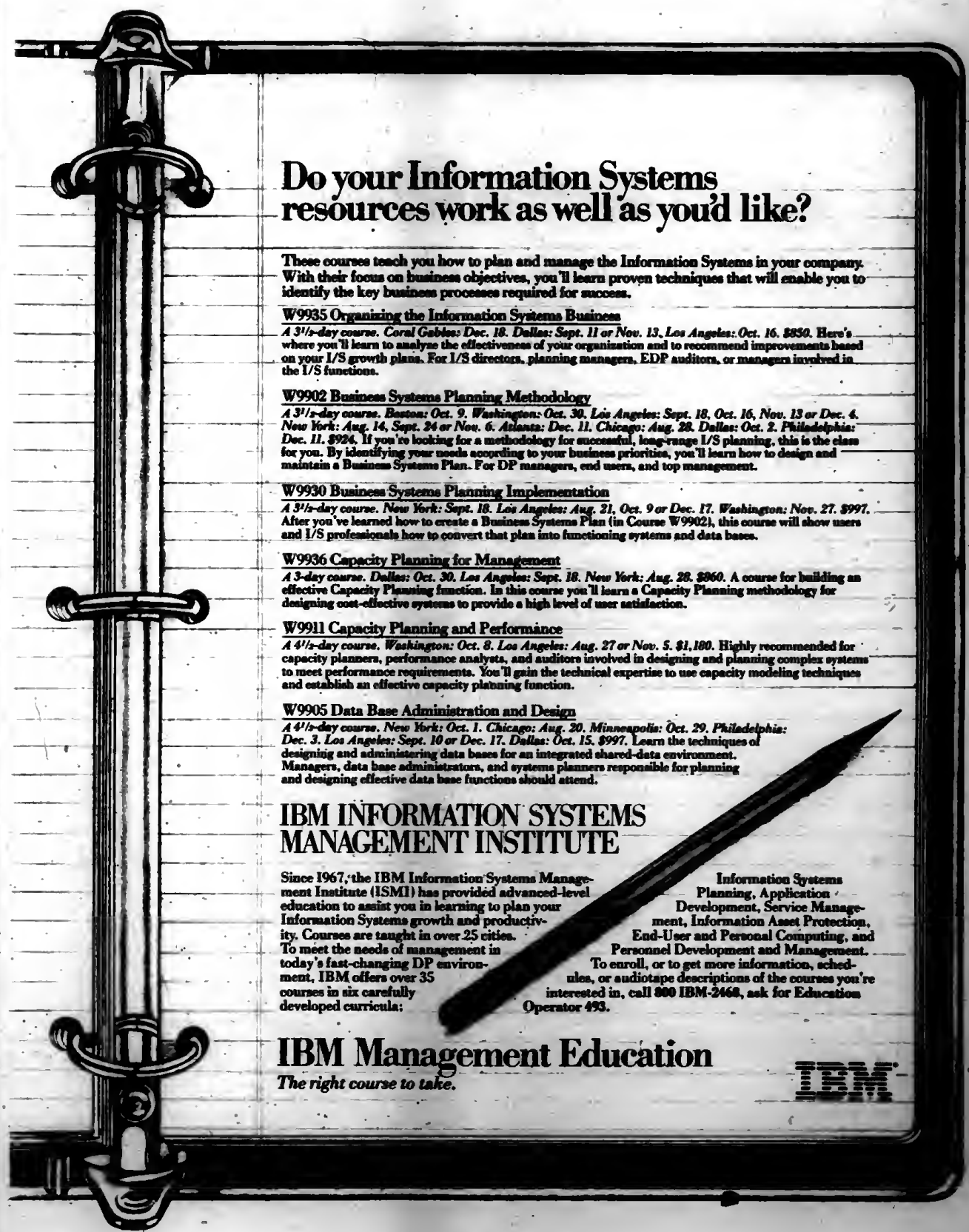
SIS SUNDATA
PC Plus

Sis Sundata has introduced PC Plus, which allows a user of an IBM Personal Computer with IBM's PC-DOS operating system to update data bases stored on Sis Sundata mainframes.

The product uses Systems Network Architecture communications protocol, interfaces with popular spreadsheet products and stores up to 500,000 records, Sis Sundata said.

Users reportedly can extract portions from a host data base, analyze, update and manipulate it on the mi-

Continued on page 90



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W9902 Business Systems Planning Methodology

A 3½-day course. Boston: Oct. 9. Washington: Oct. 30. Los Angeles: Sept. 18, Oct. 16, Nov. 13 or Dec. 4. New York: Aug. 14, Sept. 24 or Nov. 6. Atlanta: Dec. 11. Chicago: Aug. 28. Dallas: Oct. 2. Philadelphia: Dec. 11. $924. If you're looking for a methodology for successful, long-range I/S planning, this is the class for you. By identifying your needs according to your business priorities, you'll learn how to design and maintain a Business Systems Plan. For DP managers, end users, and top management.

W9930 Business Systems Planning Implementation

A 3½-day course. New York: Sept. 18. Los Angeles: Aug. 21, Oct. 9 or Dec. 17. Washington: Nov. 27. $997. After you've learned how to create a Business Systems Plan (in Course W9902), this course will show users and I/S professionals how to convert that plan into functioning systems and data bases.

W9936 Capacity Planning for Management

A 3-day course. Dallas: Oct. 30. Los Angeles: Sept. 18. New York: Aug. 28. $960. A course for building an effective Capacity Planning function. In this course you'll learn a Capacity Planning methodology for designing cost-effective systems to provide a high level of user satisfaction.

W9911 Capacity Planning and Performance

A 4½-day course. Washington: Oct. 8. Los Angeles: Aug. 27 or Nov. 5. $1,180. Highly recommended for capacity planners, performance analysts, and auditors involved in designing and planning complex systems to meet performance requirements. You'll gain the technical expertise to use capacity modeling techniques and establish an effective capacity planning function.

W9905 Data Base Administration and Design

A 4½-day course. New York: Oct. 1. Chicago: Aug. 20. Minneapolis: Oct. 29. Philadelphia: Dec. 3. Los Angeles: Sept. 10 or Dec. 17. Dallas: Oct. 15. $997. Learn the techniques of designing and administering data bases for an integrated shared-data environment. Managers, data base administrators, and systems planners responsible for planning and designing effective data base functions should attend.

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MICROCOMPUTERS

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crocomputer and send it back to the host. Data is said to be transmitted at a speed of 4,800 bit/sec.

License prices range from $1,800 to $7,500.

Six Sundata, Glenhardie Corporate Center, 1285 Drummers Lane, Wayne, Pa. 19087.

APPLIED INFORMATION SYSTEMS, INC.
AIS-PL/I

Applied Information Systems, Inc. has introduced its AIS-PL/I compiler for Digital Equipment Corp. Professional 350 series microcomputers.

AIS-PL/I reportedly can be used for traditional numeric applications, as well as for applications with extensive file processing and nonnumeric data.

The package also is said to offer an I/O interface, error reporting and standard PL/I program-control structures. In addition, it reportedly generates reentrant and recursive object code, linked to support routines.

AIS-PL/I is priced at $695.

Applied Information Systems, 500 Eastowne Drive, Chapel Hill, N.C. 27514.

RADIO SHACK
Open Access for Tandy 2000

Radio Shack announced a six-module integrated software system for use with the Tandy 2000 computer under Radio Shack's version of Microsoft Corp.'s MS-DOS operating system.

Open Access, from Software Products International, is menu-driven and makes extensive use of windowing, according to a Radio Shack spokesman.

The six modules include spreadsheet, word processing, graphics, communications, time management and a relational data base manager.

The Open Access software sells for $595.

Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

SAFE SOFTWARE, INC.
Filesafe

Safe Software, Inc. announced a file security program that reportedly encrypts IBM Personal Computer or Personal Computer XT files into unbreakable, unintelligible gibberish. According to the vendor, Filesafe runs under all IBM's PC-DOS system versions with a minimum 64K bytes of random-access memory and one disk drive.

Filesafe is menu-driven and uses a multiple substitution encryption method to convert data and text into encrypted files, a Safe Software spokesman said.

Filesafe is available in English, French, German, Norwegian and Spanish language versions. The price is $95.

Safe Software, P. O. Box 718, Dover, Mass. 02030.

INTEL CORP.
Release 6 of Irmx 86

Intel Corp. has enhanced Irmx 86, a real-time, multitasking, multiprogramming operating system.

Release 6 of Irmx 86 reportedly extends the range of microprocessors supported by the operating system to include Intel's IAPX 188, 186 and 286 in addition to IAPX 88 and 86. The operating system is modular and can be stored in programmable read-only memory devices, Intel said.

Irmx 86 reportedly supports single-board computer products, extension boards, peripheral controllers and bubble memory. Irmx 86 features interactive, system-level debugging capability, Intel said.

Irmx 86 costs $6,000.

Intel, 3065 Bowers Ave., Santa Clara, Calif. 95051.

CDI INFORMATION SYSTEMS, INC.
CDI/100

CDI Information Systems, Inc. has released an integrated information management and application development system for IBM Personal Computers and compatibles.

The CDI/100 Information Management System allows creation of a relational data base structure that can be tailored to fit any size operation, according to the vender. Some features of the CDI/100 include a prompted interface for the novice user, Basic language and compiler and a dictionary-driven relational data base system that allows for variable-length files, records and fields.

The CDI/100 is priced at $595.

CDI Information Systems, Suite 300, 1909 114th Ave. S.E., Bellevue, Wash. 98004.

MAS, INC.
Vault 3.0

MAS, Inc. has announced Release 3.0 of its Vault information security package. The new release provides several enhancements, among them tutoring and Help options.

Other enhancements are said to include the ability to work with a word processing system to protect sensitive correspondence. The program reportedly now also informs users if anyone has been attempting to access a secured file, checks each line and displays a line-by-line report of the attempted tampering.

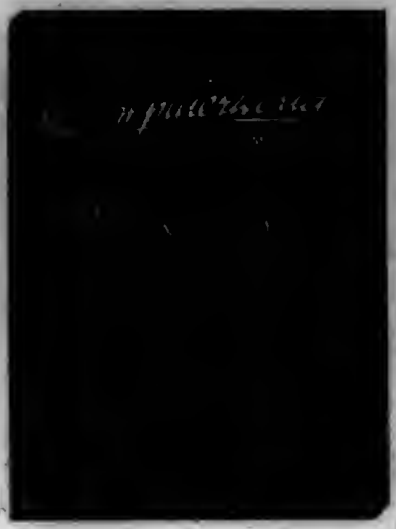
Other enhancements are warnings to users of noise leaking into telecommunicated messages or files sent over public telephone lines, according to MAS.

Vault 3.0 runs on the IBM Personal Computer, Personal Computer XT and compatibles. The program costs $285 for the standard package and $365 with the access code option.

MAS, 6826 Dean Drive, McLean, Va. 22101.

Continued on page 92

If you miss the next 2 issues of CW Office Automation, look at the issues you'll miss



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MICROCOMPUTERS

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SOFTWARE RESEARCH, INC.
Executive Report Producer

Software Research, Inc. has announced the Executive Report Producer for Convergent Technologies, Inc.'s Ctos and Btos operating systems.

Targeted at end users, the product reportedly offers features that include extraction of data from one to seven files, sorting data by one or more keys, selection of data using multiple criteria and printing multiple levels of column totals.

Available modules for the product include a report definition module, a report printing runtime module, a data dictionary module and a formatted file-dump module, the company said. The system is said to be suited for manipulating and printing data files that have been downloaded from host systems.

The product will be available in September at one-time license fees ranging from $600 to $950, depending on modules chosen.

Software Research, 660 Dover Center Road, Cleveland, Ohio 44140.

MICRO-SYSTEMS SOFTWARE, INC.
M-Script

Micro-Systems Software, Inc. has introduced M-Script, a word processor for more than 10 microcomputer systems that reportedly uses the same command structure on each.

M-Script is said to allow transportability between systems with only two keys varying.

M-Script's word processing functions reportedly include automatic word wrap, insert, delete, full screen editing, block copy and move. Global search and replace also are offered, Micro-Systems said.

Another feautre is M-Script's ability to duplicate sections of such documents as reports and contracts, according to the vendor. Options are available for formatting the final document, including right justification, hanging indents, automatic page numbering and embedded printer control commands, the company said.

M-Script is priced at $79.95 and runs on IBM's Personal Computer and PCjr; Radio Shack Corp.'s TRS-80 Models I-IV and Model 12; Zenith Data Systems Corp.'s Z-100; and Epson America, Inc.'s QX-10.

Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, Fla. 33431.

DIGITAL EQUIPMENT CORP.
Decmate DBMS

Digital Equipment Corp. has introduced a Microrim, Inc. relational data base management system for the Decmate II family. The software, called Decmate DBMS, runs under Digital Research, Inc.'s CP/M-80 2.2 Version 2.0.

Decmate DBMS reportedly features relational commands such as join, project, intersect, union and subtract. It can sort up to 10 different fields in a single command and allows users to specify up to 10 qualifiers in each selection, the vendor said.

Decmate DBMS also allows files created under other CP/M programs to become part of the relational data base and vice versa, according to the vendor.

It reportedly allows its data base to be restructured and redefined as information needs change.

Decmate DBMS is priced at $495, according to the vendor.

DEC, 146 Main St., Maynard, Mass. 01754.

SYSTEMS

QDP COMPUTER SYSTEMS
QDP-400

QDP Computer Systems has announced the QDP-400 multiuser microcomputer system, which runs the Musys Corp. Turbodos operating system and features a 6-MHz Zilog, Inc. Z80B master processor and Zilog Z80A chip for each of the two to five individual slave processors.

The QDP-400 master CPU board has 128K bytes of random-access memory with 128K bytes for each user workstation, the company said. The QDP-400 is said to be expandable with a six-slot, S-100 (IEEE-696) CPU board that accommodates double-height boards. The QDP-400 system features Winchester hard disk storage to over 55M bytes and a 1.2M-byte, formatted 8-in. floppy disk, the company said.

Up to 12 RS-232C serial ports are available, with optional networking communications through synchronous serial channels, as well as two parallel ports with Centronics Data Computer Corp. signals, the company said.

Prices for the QDP-400 system start at $8,295, the vendor said.

QDP Computer Systems, 10330 Brecksville Road, Cleveland, Ohio 44141.

QDP COMPUTER SYSTEMS
QDP-500

QDP Computer Systems has announced QDP-500, a microcomputer based on Digital Research, Inc.'s CP/M operating system.

The microcomputer features 128K bytes of random-access memory (expandable to 512K bytes), one 5¼-in. disk drive, cache memory and a Zilog, Inc. Z80 microprocessor operating at a speed of 4 MHz, QDP said.

The system can be expanded into a four-terminal system using Digital Research's MP/M operating system and includes a 10M-byte hard disk, a spokesman said.

QDP-500 sells for $1,995, the vendor said.

QDP Computer Systems, 10330 Brecksville Road, Cleveland, Ohio 44141.

TAVA CORP.
Turbo Tava

Tava Corp. has introduced an IBM-compatible personal computer with an Intel Corp. 8088-2 microprocessor, offering the performance of an 8- or 4.77-MHz CPU, as compared with the 4.77-MHz IBM Personal Computer, according to the vendor.

Turbo Tava comes standard with five IBM compatibility expansion slots, 64K-byte memory, a parallel printer port, an RS-232 communications port and two 360K-byte disk drives. The Turbo Tava packaging is designed to house two floppy disks and one 10M- to 30M-byte hard disk drive.

Price of the standard configuration is $2,495.

Tava, Suite 1011, 1711 Corinthian Way, Newport Beach, Calif. 92660.

UNITED INFORMATION SERVICES CO.
Vista-Sigma

United Information Services Co. (UIS) has announced Vista-Sigma, a product that allows engineers to access UIS's computing facilities from their microcomputers for analysis processing.

Vista-Sigma reportedly allows users to split work between microcomputers and a UIS host. The product is said to combine microcomputer hardware, terminal emulation, engineering software, program development tools and UIS's host service.

The Vista-Sigma runs on the Texas Instruments, Inc. Professional Computer. It is priced at $1,600.

United Information Services, 9200 Metcalf Ave., Overland Park, Kan. 66212.

TACTIC from page 81

in-house," he said. "However, disseminating such information non-electronically is cumbersome and expensive." The information also frequently arrives late, he added.

Until now, Harris noted, the company's POS terminals have been confined to capturing sales data, with store information being sent overnight in dial-up mode to the IBM host. With the introduction of an integrated system, branch stores will be able to perform their own payroll applications, inventory controls, electronic mail and material purchase functions, he said.

County Seat's Micro 168 systems contain 384K bytes of memory, a 10M-byte Winchester disk drive and run under IBM's Concurrent CP/M 86 operating system with Level 2 Cobol. The micros will use an IBM 3780 bisynchronous protocol with a 2,400 bit/sec modem to interface with the host computer, the company said. The POS terminals will be linked to the Micro 168 via hard-wired cable.

The department store, whose 1983 revenues reached $210 million, looked at several vendors, including IBM, NCR Corp. and Sweda International, Inc. before opting for Fujitsu, Harris said. "We wanted a system like Fujitsu's that would allow the personal computers to run the point-of-sale terminals. IBM and the other companies were putting the micro on the POS so that the POS runs the computer. That was the wrong direction for us," he explained.

The County Seat deal is Fujitsu's first major entry into the retail environment as a systems supplier using the Micro 168, according to Robin Citron, the vendor's director of marketing communications. "There is a big need in the retail industry for a microcomputer controller that has hard disk capabilities and can poll data from POS devices," she claimed.

DEMOS from page 81

Technical questions pose additional difficulties, as a demonstrator's technical knowledge is often minimal. The employees who man a booth frequently do not even know under which operating system a package runs.

Since technicians are paid to design products — not to man trade show booths — companies generally send few to a show.

Still another stumbling block for demonstrations is that recently introduced products are riddled with bugs. In the rush to get products into the public view, companies release some that have not been beta tested. The shortcomings emerge on the show floor.

Coleco Industries, Inc. announced its Adam computer at the 1983 Spring Consumer Electronics Show. At the announcement and during the show, no one was allowed to touch the machine. A large glass panel separated the machine from viewers, but one reporter noticed that Adam was not driving its demonstration. Rather, another computer hidden under the table was doing the work.

Coleco officials denied there were any problems with Adam. Adam fell several months behind its original summer shipment deadline before being shipped, with significant quality control problems that began last winter.

Another hardware manufacturer, Kaypro Corp., last fall announced an expansion board that would allow its microcomputers to run software designed for the IBM Personal Computer. At the Northeast Computer Show, a Kaypro salesman attempted to demonstrate the new products. He inserted one IBM Personal Computer program and found it would not boot. He repeated the process with the same results. Then he tried unsuccessfully to load a second program. Cleverly, he switched from the product's Microsoft Corp. MS-DOS to Digital Research, Inc. CP/M and loaded a CP/M program.

When asked about the product's ability to run IBM software, he mumbled, walked away and quietly hid in a closed area of the company's booth. Just as quietly, Kaypro later dropped its plans for the product.

VALUE from page 81

reporting. This raises new concerns for data base administrators about the integrity of their data.

Even though timeliness and accuracy have always been an objective of data processors, in the old days that often meant generating the data in machine-readable batches (cards or something equivalent), producing an initial report, checking the report for accuracy, making corrections and producing a final report — a process that could take days or weeks.

But in today's environment, where the end user may control much of the process, a file or record may be updated one moment from some terminal, then downloaded to a micro the next moment, massaged and included within a report generated in an hour.

Technology has provided timeliness, but people still must provide accuracy.

There are several ways we can go about figuring this value. First, we can probably calculate what it would cost to replace (if possible) the data if it was lost. Second, we can estimate the monetary loss to the organization if wrong decisions were made on particular projects or in general. Third, we should realistically depreciate the value of the data over time. Fourth, we can evaluate the cost of storing the data.

These, and perhaps other factors, can be plugged into a formula for assessing the value of information to an organization.

How valuable is your information? I'll answer that with another question: How valuable is your organization?

LINKS from page 81

These types of packages usually lock the user into the vendor's products, Levin said. Users can incorporate mainframe files into their microcomputer version, but they cannot read data created with packages such as Lotus' 1-2-3.

"These packages are designed to protect the company's investment in its installed base," Levin said. "Users desire microcomputer versions of popular packages. The vendors that do not supply them will lose their customers."

A buy up occurs when a mainframe company takes a microcomputer package and tailors it to share data with the mainframe package. Levin presented the example of Cullinet Software, Inc.'s Goldengate integrated microcomputer package. The guts of the program consist of Micro Data Base Systems, Inc.'s Knowledgeman; Cullinet took that program, added some features and linked it to its mainframe data base, according to Levin.

The problem with this technique is that the two systems were not originally designed to work together. In the handshake approach, two companies work together to develop a link. Levin cited Visi Answer, which was developed by Visicorp and Informatics General Corp., as an example of this technique. "This approach represents the best design of the three methods," Levin said. "Data transfer is usually easy, and security and data integrity are built into the system."

A chief limitation in all three methods is the inability to transfer data into a number of microcomputer applications, Levin said.

He mentioned one package, Loadcalc from Micro Decision System in Pittsburgh, that formats Ascii files into six microcomputer data formats. "This package gives the user maximum flexibility for using mainframe data," Levin said.

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"When users share data, several versions of the data are usually created as each user massages data to fit his needs," Levin said. "Additional problems arise because users willingly pass data to one another, but often forget to send updated information to whoever is basing decisions on the data."

Levin pointed out that, often, mainframe data bases are more suited to an application than are their microcomputer counterparts. "Storing data in individual data bases is wasteful if current data is fed daily into the mainframe, which must be accessed to update the personal computer data base," he said.

He illustrated a good application of personal computers and a corporate data base. One company's batch system had to be run five times to produce different departmental versions of a similar monthly report. The company altered the system so that it produced one file that could be loaded into Ashton-Tate's Dbase II. The five departments could then take the output and produce their own monthly reports.

"I am sure that every company could offload some of its older, batch systems to microcomputers," Levin said.

To establish micro-to-mainframe connections effectively, a company must establish clear guidelines, Levin said. He listed a number of questions that a corporation should answer: Where will the personal computer data base be stored? Who will update the data? Which employees will have access to the data? Who will document changes?

"To answer these questions properly, the company has to appoint a data base administrator for personal computers," Levin said. This person's responsibilities should include establishing mainframe data access guidelines, documenting these policies, developing off-site storage techniques and ensuring data integrity.

Legal questions also must be answered, Levin said. "Before building a personnel file, the administrator should consult the company's legal department to determine if there may be privacy issues," Levin said.

COMPUTER INDUSTRY

Integration helps cut costs at Macintosh plant

FREMONT, Calif. — When Apple Computer, Inc.'s Macintosh was first introduced, its custom-built factory here was hailed as state-of-the-art manufacturing technology.

However, a recent factory tour and discussions with Debi Coleman, director of operations at the plant, revealed that the company, rather than revolutionizing factory automation, had instead integrated existing and sometimes aging processes with human labor in an attempt to meet high-volume production requirements of 2,000 units a day.

Coleman noted recently, "This is cradle-to-grave production. While I would not call this an automated factory in the true sense of the word, the scale of what we are attempting makes this significantly different from anything else we have done before."

Materials-cost area

With labor accounting for only 8% of the costs of producing a Macintosh, Coleman asserted, the company did not go into automation in order to cut down on the number of people employed. "That is entirely the wrong way of looking at it. The real savings from automation come in the materials-cost area, and that is why we are so concerned with the quality of components," she claimed.

Apple Computer, Inc.'s Fremont, Calif.-based Macintosh production plant

Employing 340 people and covering some 160,000 square feet, the single-product plant, in which the company has invested $21 million, is focused mainly on the assembly of small parts such as integrated circuits, memory devices, microprocessors, capacitors and resistors. Only a few Macintosh components such as video displays, chassis, housings and power supplies could be said to be bulky.

Interestingly enough, there is no single master computer, although Coleman said the company is seeking a single, continuous processor. Instead, the factory's operations are overseen by three Digital Equipment Corp. PDP-11/70 minicomputers, with one being used to control the plant's automated storage and retrieval system, another used as a business information system to monitor sales forecasts, purchasing requirements and account payables and a third computer acting as a back-up system.

When components first come into the factory, they are bar-coded and carried by battery-powered, automated guided vehicles to the plant's two tote-stacker automated storage and retrieval systems that themselves are controlled by a DEC PDP-11/24 minicomputer.

When parts are needed for assembly, they are retrieved from the tote stackers and sent to each workstation via a conveyer network. Distribution of the units is controlled by a traffic management system consisting of two 32-bit Data General Corp. Eclipse superminicomputers.

The assembly process begins with the building of the Macintosh's printed-circuit board. Between four and five workers use automated dip inserters to insert integrated circuits, axial components, resistors, capacitors and diodes. The balance of the

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AT&T and Olivetti Corp. formed a joint venture to market and license Unix System V in Europe/**96**

■ Asher Edelman, the arbitrageur who earlier this year shook up Management Assistance, Inc., said he has purchased a block of shares in another mini vendor, Mohawk Data Sciences/**96**

■ Apple Computer, Inc. linked up with Computerland, Inc.'s central distribution channel, but days later a smaller retail chain announced it was dropping Apple products/**99**

Study details Japan's high-tech strengths, weaknesses

By David Olmos
CW Staff

FRAMINGHAM, Mass. — Despite all the gloomy predictions, the Japanese aren't yet ready to wipe out 35 years of leadership by U.S. computer makers, a recent industry study concluded.

Although Japanese computer makers have produced many leading-edge products and technologies, U.S. manufacturers still control about two-thirds of the information processing business in noncommunist countries, according to the report from International Data Corp., a research and consulting group based here. Moreover, the Japanese share of the computer market outside the Pacific Rim region is less than 10%.

"Technologically, the U.S. doesn't have to concede anything," stated the 103-page study titled the "Japan Data Book." "In mainframes, minis and personal computers, the U.S. leaders still have a demonstrable edge. To date, Japanese competitive successes have been based largely on peripheral and component production efficiencies, not innovative features."

In summarizing specific areas of the Japanese-U.S. computer industry, the report also made the following conclusions:

■ Software: The U.S. lead is measured "in years" for software standards ranging from microcomputers to supercomputers.

■ Communications: The large Japanese computer makers are also strong in the telecommunications area because they have been the traditional suppliers to the Nippon Telephone & Telegraph Corp., the Japanese communications giant.

■ Technology: Japanese and U.S. companies are at parity in the areas of semiconductor memories, imaging systems and fiber optics. The U.S. maintains the edge in circuit packaging, microprocessors, thin-

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Altos hoping for smoother sailing ahead

SAN JOSE, Calif. — Following a series of management upheavals that rocked the traditionally steady company, Altos Computer Systems, Inc. is focusing on a new business strategy in the Microsoft Corp. Xenix-based multiuser micro market.

Altos president and founder, David Jackson, is hoping that a strong balance sheet (estimated revenue this year of over $100 million) and future product introductions will mark the beginning of a smoother passage for the company's management team in the second half of 1984 than it experienced in the first half.

"The ability to have a balanced management team is the key to success in this business. It's no good having one piece of the pie, if another

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Court upholds verdict against DG in antitrust suit

INDUSTRY INSIGHT
David Olmos

In astronomy, a nova is a star whose light output suddenly increases tremendously, then fades away to obscurity in a few months or years. Data General Corp. may be wishing on its lucky star that a $100 million antitrust suit involving its Nova CPU and software would vanish like its astronomical namesake.

Last month, a U.S. appeals court in San Francisco reversed the decision of a federal district court and upheld a verdict against DG in the five-year-old antitrust suit. The appellate court ordered the case returned to the trial court to determine damages. Industry observers say the case could have broad implications for the computer industry.

The suit was originally brought in 1978 by Fairchild Camera and Instrument Corp. and several other companies, only one of which, Digidyne Corp., remains a plaintiff alongside Fairchild. At issue is whether DG, by refusing to license its Nova operating system, Rdos, except to purchasers of its Nova CPUs, has violated the Sherman Antitrust Act by unlawfully "tying" the two products.

The federal court upheld Fairchild and Digidyne's claim that DG has unlawfully restricted competition by forcing a customer who wants to buy the Rdos operating system to also purchase the Nova CPU. The court found that a customer demand existed for the CPU apart from its operating system, and the two products could have been provided separately had not DG made them inseparable. DG has argued, unsuccessfully, that the tyed products are insignificantly competitive in their respective markets and, therefore, lack the requisite "economic power" to corrupt the marketplace.

The case's outcome is important to vendors with tying sales arrangements similar to DG's. It also is significant for the Fairchilds of the computer world which might like to manufacture CPU look-alikes for use with a particular operating system, as well as to users who might purchase cheaper look-alike versions, industry observers said.

DG has said it will ask the appellate court to rehear the case. And the minicomputer maker, which has already spent a healthy sum contesting the suit, has suggested it

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Edelman buys a 7% stake in Mohawk Data Sciences

Plans to file statement with SEC documenting purchase

NEW YORK — Asher B. Edelman, the midtown Manhattan stock arbitrageur who successfully fought a proxy contest earlier this year with Management Assistance, Inc. (MAI) [CW, Feb. 13], has purchased a stake in a second minicomputer manufacturer.

Edelman, who was elected to the MAI board in the proxy election, said recently he plans to file a statement with the Securities and Exchange Commission (SEC) documenting his purchase of 7% of the outstanding shares of Mohawk Data Sciences Corp., the $402 million Parsippany, N.J.-based computer vendor.

Edelman told reporters he does not "have a lot of plans" for his 7% stake in Mohawk Data. "I'm afraid that I will have to let the [SEC] filing speak for itself," Edelman said, also declining to comment on whether or not he had been in contact with Mohawk Data.

At Parsippany headquarters, John C. Walters, executive vice-president and corporate secretary of Mohawk Data, said that the company did not anticipate taking any antitakeover measures to forestall a proxy bid on the part of Edelman. "Three other people purchased over 5% of our stock in the last year, and none of them did anything like that," Walters maintained.

But Walters would not say if Mohawk Data was discussing the possibility of offering a seat on its board to Edelman, adding the firm is "waiting to see what his SEC filing has to say before reacting."

Run of bad times

Like MAI, Mohawk Data is a maker of minicomputers that has had a run of bad times recently.

The company closed down its Costa Mesa, Calif.-based IBM 3270-compatible producing Trivex division in May, leading to a $56.4 million loss in the fourth-quarter that ended April 30.

For the year, Mohawk Data lost $49.7 million on sales of $402.5 million. Earlier, the company revised its credit agreement with a group of 10 banks to provide Mohawk Data with $115 million in unsecured loans maturing in 1988.

Meanwhile, an electronics industry trade journal identified New Jersey private investor Bennett LeBow as head of the group that proposed to acquire MAI's Tustin, Calif.-based Basic Four Information Systems unit for $30 million in cash and $75 million in securities.

Pentagon targets AI applications in military efforts

OUTSIDE LINES
Bohdan Szuprowicz

By Bohdan O. Szuprowicz
Special to CW

The Strategic Computer Initiative (SCI) of the Department of Defense (DOD) is the single largest computer research effort by the U.S. to develop a new generation of superintelligent computers to control highly effective one-shot/one-kill weapons systems.

The new Pentagon program envisages the development of systems that will accept inputs from various sensors and exhibit human-like capabilities to see, hear and understand voice commands, make inferences from incomplete data and issue voice instructions or even take control in situations too complex for human operators to respond to in time.

The most serious contender in this race is Japan with its fifth-generation computer project. The UK is also making a bid with its $500 million, five-year development program. Some elements of such research are also discernible in the international Esprit program already under way within the European Common Market.

Funding set at $50 million

The Pentagon's SCI program is being carried out by its Defense Advanced Research Projects Agency (Darpa) and is expected to cost $600 million during the next five years. Initial funding for fiscal 1984 is already set at $50 million and will increase rapidly to $95 million for fiscal 1985 and reach $150 million in fiscal 1986.

Major research thrusts of the SCI program will center on artificial intelligence, expert systems, parallel computer architectures and pertinent microelectronics.

Specific objectives of the undertaking are somewhat better defined on three major military application areas for each branch of the armed forces. While the military orientation of the program is already coming under attack by various groups, it is also seen by others as a major contribution by the government to further research into advanced areas of information processing that private industry could not readily afford.

An analysis from the Office of Technology Assessment reveals that as recently as 1982, 90% of the funding for artificial intelligence and parallel computer processing originated from the Pentagon. Venture capital financing of artificial intelligence start-ups is only now getting under way and has been relatively scarce for the supercomputer segments of the hardware industry.

Unmanned automated vehicle

For the Army, the SCI is focusing on the development of a new, unmanned automated vehicle, sometimes dubbed the "robot tank." Such a vehicle is expected to patrol the front line or any hostile territory and use various sensors to collect real-time data about the environment. Onboard, intelligent computers would then interpret the data, communicate with remote controllers, make rapid decisions and take specific action appropriate to the occasion without any risk to human life. A ground surveillance robot is already under development by the Navy, and about 20 companies are believed to have similar projects on their drawing boards.

Robot Defense Systems is a recent start-up in this area and is already undertaking development of a track-laying vehicle guided by several embedded computers that process inputs from infrared detectors, radar rangefinders, sonar, sound detectors, stereo cameras, gas sniffers, smoke detectors and temperature probes.

The intelligent computers in the Prowler vehicle will be designed to identify friendly or hostile objects; reconnaissance, sentry and combat versions of this unit are planned. The company is a spin-off from Fared Robot Systems and recently raised $2.9 million in a public offering underwritten by Nielson & Clark.

In the case of the Air Force, the SCI program is centering on developing a microelectronic "pilot associate," capable of making combat decisions faster than the best trained pilots. Because of the complexity of such a system, the emergence of new ventures to develop it is unlikely, but companies involved in very high-speed integrated circuits and forward-looking infrared systems, such as Gigabit logic and Flir systems, may benefit indirectly from these programs.

Perhaps the most ambitious SCI research is being undertaken for the Navy. The "battle management system" is being developed to manage complex flight patterns and maneuvers of aircraft from aircraft carriers and their escort ships.

These systems are planned to collect and interpret incomplete intelligence data in real time in such a way that prediction of likely events can be made automatically while extensive sea battles are under way.

Szuprowicz is president of 21st Century Research of North Bergen, N.J. and publisher of Supergrowth Technology USA.

EDS files bias suit against U.S. Immigration

WASHINGTON, D.C. — Electronic Data Systems Federal Corp. (EDS) recently filed suit in federal court here, charging that the U.S. Immigration and Naturalization Service acted with "bias and favoritism" when it awarded a $61.3 million contract to IBM for DP hardware, software and related services.

EDS, the only other bidder, alleged that IBM undercut its bid after a secret meeting on May 10 between IBM representatives and members of the Immigration Service source evaluation panel. EDS further alleged that the agency favored IBM throughout the procurement.

"In a closed-door, after-hours meeting from which all members of the [Immigration Service] contracting office were excluded, [Immigration Service] source evaluation panel members improperly and unlawfully engaged in discussions with IBM after submission of best and final offers," the EDS complaint maintained. As a result of this meeting, the complaint continued, IBM cut its bid by about $3.3 million to a level that was $2,713 lower than EDS' bid.

Preliminary Injunction

The EDS suit, which was filed June 13 in U.S. District Court here, seeks a preliminary injunction against performance of the IBM contract and asks the court to award the contract to EDS.

An Immigration Service spokesman declined to comment on the EDS suit.

The eight-year contract calls for IBM to supply 64 of its 4300 series and System/36 computers and more than 8,000 IBM 3180 series terminals, word processors and other office automation equipment and services, according to Immigration Service officials.

The Immigration Service called the contract the "biggest step forward in its automation program" and said it will standardize DP and word processing equipment throughout the agency.

The award was announced by the Immigration Service on May 24.

Telex, Raytheon come to terms on RDS division

TULSA, Okla. — Telex Corp. and Raytheon Co. recently announced that they have executed a definitive agreement for the previously announced transfer of Raytheon's Data Services Division (RDS) to Telex.

Under the terms of the agreement, Raytheon, which had earlier announced the termination of the division, will receive a combination of cash, notes and other considerations, including future revenue sharing provisions. The aggregate value of the agreement should exceed $200 million, the companies said.

The final closing, subject to governmental reviews, should occur in early to mid-August, according to the two companies.

Telex said that by that time approximately 2,100 RDS employees worldwide will have been offered employment with Telex Computer Products, Inc., the major operating subsidiary of Telex that will assume the worldwide business of RDS.

AT&T, Olivetti unveil offspring

NEW YORK — AT&T and Olivetti Corp. recently announced a joint venture establishing a company that will license and support the Unix System V operating system in Europe. The new company, called Unix Europe, will begin operations immediately.

Unix Europe is intended to fill a gap in AT&T's support of Unix, a spokesman said. Among the requests voiced most frequently by European Unix users are the need for AT&T to improve responsiveness, provide periodic review sessions, participate more actively in European Unix user groups, adapt the product to different languages and provide more application software, said Richard Shahpazian, AT&T's director of software sales and marketing.

Unix source code today is licensed from AT&T in the U.S., despite the fact that about 25% of its users are in Europe. Unix Europe will expedite licensing agreements, offer faster service and improve distribution, training and support, Shahpazian said. The company also plans to rewrite the user interface in other languages. The formation of Unix Europe is also intended to promote more Unix-based software development from third-party vendors, Shahpazian said.

The move of AT&T's European Unix support from the U.S. to London will not result in staff reductions, Shahpazian said. Rather, AT&T will boost support of U.S. licensees. Unix Europe's initial staff will be composed of non-AT&T and non-Olivetti employees, he said. However, AT&T will send representatives to assist in the transition.

The chairman of Unix Europe is Jack Scanlon, vice-president of AT&T's Computer Systems Division. The managing director is Vanni Papi, a Digital Equipment Corp. alumnus.

Computerland, Apple set marketing pact

CUPERTINO, Calif. — Computerland, Inc. and Apple Computer, Inc. recently announced an agreement to make Apple's product line available to the 670 Computerland franchisees throughout the world. However, a smaller computer retail chain later announced its intention to drop Apple products.

According to the two companies, qualifying Computerland franchisees in the U.S. and Canada can begin carrying Apple products, effective Aug. 1.

However, full-scale product shipments will not begin until September, when current product shortages are expected to be alleviated, the companies said. International franchisees will begin receiving shipments sometime "in the near future."

Apple's thrust

The agreement represents Apple's increasing thrust to move its products through retail channels. In May, the company announced it planned to work directly with its 1,800 authorized Apple dealers and terminate its relationships with manufacturers' representative firms.

Announcing the Computerland pact, Apple President John Sculley said the company "expects to significantly increase the number of computers the company will sell in the coming year." Sculley also said Apple intends to distribute its products primarily through retail dealerships.

Apple has been noticeably absent from Computerland's central purchasing arrangements in recent years. Sculley said Computerland franchisees "will provide us with a market presence in geographic areas not presently represented by Apple."

Computerland presently has 540 stores in the U.S., with half of the franchisees already authorized as Apple dealerships, according to the company.

Compushop drops out

Compushop, Inc., several days after the Computerland announcement, said it will discontinue selling Apple products in its 50 company owned and operated retail stores.

Warren Winger, chairman of Compushop, said the company had decided to offer only products using the Microsoft Corp. MS-DOS operating system.

The company said the decision to drop Apple products will allow it to offer better support by concentrating on one operating system.

Firm posts record highs

SUNNYVALE, Calif. — Advanced Micro Devices, Inc. recently reported that first-quarter revenues were up 117% over the comparable quarter one year ago, while profits were up 370% over the same period.

Revenues for the quarter were a new high, the company said. The company posted revenues of $234.2 million, compared with $108 million a year earlier.

Profits for the quarter were $38.2 million, or 66 cents per share, compared with $8.1 million, or 14 cents per share, a year ago.

The company also announced it recorded record bookings of $326 million in the quarter, up 110% from the same quarter a year ago.

COMPUTER INDUSTRY

SUPERSHORTS

Sandra L. Kurtzig, founder and chairman of **Ask Computer Systems, Inc.** of Los Altos, Calif., has been chosen by the American Academy of Achievement as one of 1984's "giants of accomplishment" and will receive the academy's Golden Plate Award at its 23rd annual Salute to Excellence weekend program.

■

Wang Laboratories, Inc. and **Quotron Systems, Inc.**, announced a nonexclusive agreement to provide a range of integrated financial and data processing services. The agreement is the result of an earlier commitment by the two companies to allow users of Wang and Quotron systems to access and act on information from various financial data bases.

According to the agreement, users of Wang VS systems will have access to Quotron's financial information services data base. This data base offers complete transaction and quotation data on listed and over-the-counter stocks, bonds, commodities and options from domestic, Canadian, European and Far Eastern exchanges, as well as statistical information calculated by Quotron.

■

Gould, Inc. announced it has joined the multicompany research venture **Microelectronics and Computer Technology Corp. (MCC)**. Gould is the 18th participant in MCC, which was formally launched in 1983 to conduct long-range advanced electronics research.

■

Tandem Computers, Inc. and **Zitel Corp.** announced that all legal actions between them have been settled by mutual dismissals. Details of the settlement were not made available.

■

Columbia Data Products announced that it has reached an agreement with **Hall-Mark Electronics**, naming the Dallas-based company as national industrial distributor of Columbia's 16-bit IBM Personal Computer-compatible product line.

■

Nippon Telegraph & Telephone Public Corp. (NTT) of Tokyo and **AT&T International** announced that NTT has purchased $25 million worth of software from AT&T International.

The software is for NTT's advanced traffic observation and management information collection system. Delivery is scheduled for June 1985.

■

Integrated Automation announced a $3.7 million contract with the **Internal Revenue Service** to provide a digital, optical laser disk-based document automation system. The system reportedly will provide higher accuracy and increased efficiency in the processing of income tax returns from taxpayers.

■

NBI, Inc. announced the creation of the NBI technical products division to develop and market a series of computer products for the technical, engineering and scientific communities.

"The marketplace for supermicro computers serving the technical community is growing rapidly, and no one supplier currently has a significant share of the market," according to NBI Executive Vice-President Mark J. Stevenson.

■

BMC Software, Inc. of Stafford, Texas, recently obtained a consent judgment in U.S. District Court in Chicago in which three companies and four individuals admitted to gaining access to one or more of BMC's trade secrets, although they did not admit liability or wrongdoing, and agreed not to divulge or use any of the information at issue. BMC claimed the companies and individuals obtained the information from a demonstration tape and seminars for the firm's Data Packer program that were available to potential clients.

■

Pacific Bell Telephone Co. announced a five-year agreement with **Telco Systems, Inc.**, a manufacturer of fiber-optic transmission systems, for the purchase of $25 million worth of fiber-optic transmission equipment. Under the agreement, Pacific Bell will purchase Telco Systems' 828 multiplexers and its 828F-, M90- and M560-type fiber-optic terminals.

■

Ultimate Corp. has formed **Ultimate Southern Florida, Inc.**, a wholly owned subsidiary based in Pompano Beach, Fla.

■

Xebec announced the establishment of **Epelo Corp.**, a majority-owned subsidiary dedicated to design and development of disk drives. Frank C. Gibea is president of the new subsidiary.

■

Data General Corp. announced the president's roundtable, a new addition of management support for authorized DG system distributors. The roundtable, scheduled to be a quarterly event, is a meeting of DG senior executives and system supplier program managers with executives of the company's authorized distributors.

■

Informatics General Corp. will establish an Asian office in Tokyo this summer. The office, which will serve Asia and Australia, is scheduled to open in August.

■

BASF Systems Corp. announced the opening of a new $7 million, state-of-the-art, 80,000-sq-ft facility in Bedford, Mass., solely dedicated to the manufacture of floppy disks.

BASF Systems is wholly owned by BASF AG, headquartered in Ludwigshafen, West Germany. The man-

COMPUTER INDUSTRY

ufacturing giant — one of the largest chemical companies in the world — has an estimated 8% share of the worldwide market in flexible media.

■

Due in large part to a shortfall in sales, Corvus Systems, Inc.'s losses for the fourth quarter and the 1984 fiscal year ended May 31 will be greater than anticipated by the financial community at large, according to Michael D'Addio, Corvus president. As a result, the company is implementing cost-cutting measures, including a reduction in its work force.

■

Auragen Systems Corp. has signed a multiyear distribution agreement with the Japanese computer manufacturer Sord Computer. The agreement, which includes a technology exchange, allows Auragen's fault-tolerant, Unix-based System 4000 to be marketed under the Sord label in Japan.

■

California Devices, Inc. (CDI) announced the opening of its gate-array design center, located at CDI's San Jose, Calif., headquarters. CDI offers a three- to five-day course in gate-array design using CDI's macro library.

■

NCR Corp. announced plans to build a data processing facility in the Hartford, Conn., area. The center will be dedicated to providing online information processing services to thrift institutions — savings banks, commercial banks, savings and loan associations and credit unions — throughout the New England region. The completion date for the Hartford data center is first-quarter 1985.

■

Timeplex, Inc. announced that it has withdrawn its suit against Protocom Devices, Inc. and four individuals who had formerly been employed by Timeplex. In the litigation, Timeplex had sought an injunction and other relief, claiming misappropriation of confidential information. The discontinuance was part of a negotiated settlement whereby Protocom has agreed to provide Timeplex with certain design information and has licensed Timeplex with regard to certain products.

■

Data Phase Corp. and Uninet, Inc. announced that their respective organizations have entered into a joint venture. The agreement is to develop a data-sharing information network that will eventually access library information directly into businesses, homes and educational institutions throughout the U.S. via Uninet's international public data network.

■

The computer systems unit of Sperry Corp. has reorganized its former product division operations into a micro products division and a systems products division. The micro products division is responsible for all personal computer products, Sperrylink office systems, communications and terminal devices and data entry products. The micro products division is chartered to obtain new products through internal development, OEM suppliers, acquisitions and joint ventures to ensure a timely flow of Sperry products to the microcomputer marketplace.

■

William C. Thompson, president and chief executive officer, has announced the formation of Filetek, Inc., which will provide online library storage systems in the 100G-byte and larger range. Thompson announced that Filetek has acquired the rights to Centennial Computer Corp.'s storage management software and certain other technology related to Centennial's MS/1, which is an IBM 3850-based product marketed by Centennial as a back-end mass storage system for Sperry 1100 computers. It was also announced that John G. Burgess has joined Filetek as vice-president, product development.

■

Providence Gravure, Inc., a wholly owned subsidiary of Providence Journal Co., in partnership with British Printing & Communications Corp. PLC, has formed a new company, Compuscolor International.

The new company reportedly will produce a comprehensive state-of-the-art electronic prepress service for sale to the U.S. printing and publishing industries. U.S. printers reportedly will be able to drive their engraving systems directly by satellite-transmitted digital data, thus ensuring complete image consistency and control.

COMPUTER INDUSTRY

MERGERS AND ACQUISITIONS

Etherington Industries, Inc., New Haven, Conn., will purchase Cincinnati Milacron, Inc.'s U.S. Printed Circuit Board Materials Division. The sale will consist of both the business and the assets of the division, which include production facilities in Blanchester, Ohio.

The agreement is expected to be finalized within the next two months. No terms of the agreement were disclosed.

■

Equatorial Communications Co., Mountain View, Calif., has signed a letter of intent to acquire **DMC Systems, Inc.**, a privately held corporation. The purchase price of $2 million will be composed of $1.9 million payable in Equatorial common stock, valued at market, and $100,000 in cash. The acquisition is subject to the execution of definitive agreements and the obtaining of appropriate approvals.

■

Mellonics Systems Development, Woodland Hills, Calif., a division of Litton Industries, Inc., has acquired the Data Services Operation of Informatics General Corp., headquartered in Fairfield, N.J. Terms of the agreement were not disclosed.

■

SEI Corp., Wayne, Pa., a provider of software, financial and information services to the financial community, announced the completion of its acquisition of the assets and products of the financial services software group of Index Systems, Inc., Cambridge, Mass. The purchase price is approximately $4 million.

■

Perkin-Elmer Corp., Norwalk, Conn., and **Hadco Corp.**, Salem, N.H., announced an agreement in principle in which Hadco will purchase the multilayer printed-circuit production division of Perkin-Elmer's Qualitron Corp., a subsidiary in Danbury, Conn. Terms of the acquisition were not disclosed.

■

Computer and Systems Engineering (Case), Watford, England, has completed its acquisition of **Rixon, Inc.**, a U.S. data communications manufacturer. The acquisition, valued at approximately $27 million net of Rixon's cash balances, was financed by the placement of $3.5 million additional Case shares on the London Stock Exchange.

■

Printronix, Inc., Irvine, Calif., announced that it has signed an agreement in principle to acquire **Anadex, Inc.**, a privately held California-based company engaged in the design, manufacture and sale of serial matrix computer printers, in exchange for $8 million of Printronix common stock.

The acquisition is subject to the execution of a definitive agreement, approval by the boards of directors of both companies and the shareholders of Anadex and certain other conditions and approvals.

■

Design Compudata, a directory of software and hardware available for design firms published by Practice Management Associates Ltd., Brookline, Mass., has been sold to **Graphic Systems, Inc.**, Cambridge, Mass. Terms of the agreement were not available.

■

Distributed Logic Corp., Garden Grove, Calif., has entered into an agreement to acquire **Accord Computer Corp.**, Irvine, Calif. Under the terms of the agreement, Distributed Logic will exchange an undisclosed number of its shares for the outstanding stock of privately held Accord Computer. The acquisition is subject to certain conditions.

■

Micro Focus Group PLC, Palo Alto, Calif., is extending its product line of micro-to-mainframe programming tools by acquiring UK-based **Softwright Ltd.** Terms of the agreement were not available.

■

Plantronics, Inc., San Jose, Calif., announced the purchase of all the outstanding shares of **Columbia Automation, Ltd.** of Windsor, Berkshire, UK. Terms of the agreement were not revealed.

■

Automatic Data Processing, Inc., Roseland, N.J., has signed final contracts for the acquisition of the payroll services business of **Security Pacific National Bank** for an undisclosed consideration.

■

Xidex Corp., Mountain View, Calif., announced it has completed an agreement to acquire 100% of the stock of **Sun-Flex Co., Inc.**, Novato, Calif. The acquisition was made for approximately 936,000 shares of Xidex common stock on a pooling of interests basis. Sun-Flex is expected to provide $10.5 million in additional revenues for Xidex in fiscal 1984.

■

Science Management Corp. (SMC), Bridgewater, N.J., announced that **SMC Intech, Inc.**, a wholly owned subsidiary of SMC, has been sold to **SMC Seicom, Inc.**, a joint venture company, with 36% owned by SMC and 64% by Japanese interests, for $1 million cash plus notes and securities of SMC Seicom.

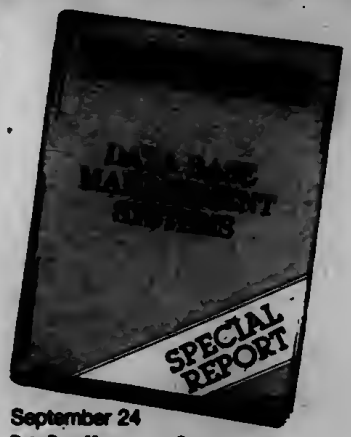
In connection with the acquisition of SMC Intech, the Japanese interests have contributed additional equity capital to SMC Seicom.

In April, SMC redeemed some of its SMC Seicom common stock in exchange for SMC Seicom preferred stock, reducing its common stock ownership in SMC Seicom from 64% to 36%. For financial statement purposes, these transactions will provide SMC a net pretax gain of $825,000 in the second quarter.

If you're not in *Computerworld's* next five special reports, look at the issues you'll miss

August 27

Minis and small business systems
We'll take a close look at the growing number of applications available. Plus we'll include reports from users on the problems they've had in selecting and implementing these systems, and how they solved them. Also, we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of minis and small business systems.
Closes August 10



September 24

Data Base Management Systems
A comprehensive report geared toward a realistic understanding of DBMS. We'll include articles from users and industry experts on how to evaluate, select, implement, and trouble-shoot DBMS. And we'll update readers on recent developments, as well as offer users' solutions to common and not-so-common DBMS problems.
Closes September 7

October 29

Protecting the Corporate Information Resource
We'll discuss how to protect hardware & software resources, people resources, and physical plants. There'll be articles on: uninterruptible power supplies, data security monitors, data encryption software, disaster recovery centers (offsite data storage), fault-tolerant processing, data transmission security, protecting the computer room, and contingency planning.
Closes October 12

November 26

Data Communications Terminals
Users and vendors will comment on how terminals are making computers more responsive to organizational needs. Topics include: how to get the most out of dumb terminals; an update on smart and intelligent terminals; and guidelines for determining terminal's needs and selecting the equipment to meet them.
Closes November 9

December 31 & January 7

'85 Forecast
Our annual review and forecast issue. We'll examine some of the major events of 1984, and explore what lies ahead in 1985.
Closes December 14

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COMPUTER INDUSTRY

EXECUTIVE CORNER

Mark A. Floyd has been named vice-president and chief financial officer of Interphase Corp.

■

Mike Kim has been appointed vice-president, engineering, CRT products, at Selanar Corp.

■

Michael S. Friedman has been appointed director of engineering for Dylon Data Corp.

■

Sheldon H. Schumaker, president and chief executive officer, has resigned from the company and the board of Citel, Inc. Resignations were also accepted from **Gregory P. Rusbasch**, vice-president, finance, and chief financial officer; and **Philip Shiota**, vice-president, technology. **Albert Butcher** has been named executive vice-president, acting chief executive officer and acting chief financial officer of the company pending further appointments.

■

Erik T. Ringkjob has been appointed president and chief operating officer at Intecom, Inc.

■

Richard E. Horner has been named president and chief executive officer of Western Union Personal Communications, Inc. **Fredric R. Boswell**, president of E. F. Johnson Co., succeeds Horner as E. F. Johnson's chief executive officer.

■

Allan L. Coon and **Constantine Kamnitsi** have been appointed to senior vice-president positions at Alpha Industries, Inc.

■

Daisy Systems Corp. announced the formation of its personal systems division. The new division, headed by **Harvey Jones**, senior vice-president and general manager, will be responsible for research and development, engineering and marketing of Daisy's personal logician products.

■

Ivan Nazario has been promoted to vice-president at Quantum Caribe, Inc., a wholly owned subsidiary of Quantum Corp.

■

The Texas Instruments, Inc. board of directors has appointed the following vice-presidents: **Lyle D. Chaffin**, semiconductor group, Sherman, Texas; **Philip B. Coup**, semiconductor group, Dallas; **Robert England**, semiconductor group, Houston; **Ramesh L. Gidwani**, semiconductor group, Houston; **Charles L. Boyd**, data systems group, Austin, Texas; **Stephen L. Leven**, data systems group, Austin, Texas; **Myron I. Weinstein**, corporate staff.

Joe V. Chapman has been named managing director of TI Singapore.

Other changes in titles and/or key operating assignments include: **K. Balasubramanian**, named manager of programmable products in Houston; **Glenn J. Culhane**, named vice-president, semiconductor group, and manager of Custom Circuit Operations in Dallas; **Marco Landi**, named vice-president, semiconductor group, and manager of European semiconductor marketing in Nice, France; **Gerald D. Rogers**, named manager, Microprocessor Product-Customer Center in Houston; **Thomas J. Gentry**, named vice-president and controller, data systems group, Austin, Texas.

■

Software Research Corp., a privately held company, appointed **Paul R. Tucker**, a 23-year veteran of Honeywell, Inc., to the new post of president and chief executive officer.

■

Atasi Corp. named **Donald R. Lundell** its president and chief executive officer. In this capacity, he will be responsible for the strategic direction of the company as well as management of day-to-day operations. Lundell, formerly vice-president, engineering, has also been elected to the board of directors. **Alan J. Grant**, who has served as interim president since February, continues as chairman of the board.

■

Kim Maxwell has been named president of Racal-Vadic, Inc. **Pete Bolles**, former president, is now chairman of the board.

■

Philippe Villers, newly elected to the position of chairman of the board at Automatix, Inc., the robotic and artificial vision systems company; announced the election of co-founder **Michael J. Cronin** as president and chief executive officer of Automatix and the creation of an additional board seat to which Cronin was also elected. **Michael N. Schuh** was promoted to vice-president of marketing, and **Lucien Dana** was appointed vice-president, Europe. The board also reelected all other officers of the company to their present positions.

■

Gerald F. Taylor has joined Applied Materials, Inc. as vice-president and chief financial officer.

■

George Peterman has been appointed vice-president, corporate resources, at Language Processors, Inc. (LPI). Prior to joining LPI, he worked at Honeywell, Inc., Digital Equipment Corp. and Data General Corp. **David Clemmo** has been promoted to vice-president, finance. Prior to LPI, he held positions in Penriwell Publishing Co.'s advanced technology group. **Robert Lapides** has been appointed director, Eastern region sales. Lapides previously was employed by NCR Corp. **James Maloney** was appointed director, language products. Prior to joining LPI, he held positions at Intermetrics, Inc., DEC and ITT.

■

Dr. Robert W. Taylor has been appointed vice-president, engineering, for Britton Lee, Inc. Prior to joining Britton Lee, Taylor worked for the IBM Research Laboratory.

SUIT from page 95

may take the case to the U.S. Supreme Court before the damages trial.

But a Boston attorney who specializes in computer law and who has followed the Fairchild-DG suit said he doubts the Supreme Court will hear the case, largely because that court already addressed the tying issue in a non-computer-related decision earlier this year. He also doubts that the federal appellate court will change its mind and rehear the case. Assuming those predictions hold true, the damages trial would begin.

While DG has asserted that the suit "will not have a material adverse effect on its business or financial condition," a case can be made to the contrary. Under the antitrust law, any damage award would automatically be tripled. If the jurors, for example, find that Fairchild is entitled to just half the $100 million in damages it is seeking, DG would have to cough up a cool $150 million. And that's not exactly milk money.

JAPAN from page 95

film storage products and new hardware architectures.

According to the IDC report, the Japanese mainframe market is about 25% of that in the U.S., with an installed base of approximately 9,000 units in 1982. The study noted that the Japanese "have been trying to establish a major presence in the mainframe market for more than a decade" and that considerable investment in the mainframe area has produced substantial results. Despite the smaller market in Japan, the three largest Japanese mainframe manufacturers — NEC Corp., Fujitsu Ltd. and Hitachi Ltd. — now ship large systems at levels comparable to that of the Bunch group — Burroughs Corp., Sperry Corp., NCR Corp., Honeywell, Inc. and Control Data Corp. — in the U.S.

In the minicomputer arena, the Japanese have had little worldwide impact, the report said. Total shipments of minis in 1982 were only about 12% of those in the U.S. One reason for this slight impact is that minicomputers in Japan are usually used for industrial automation and control and technical and research applications, with little use in commercial markets.

The Japanese personal computer market is roughly 15% the size of the U.S. market and is highly competitive. Japanese manufacturers have had little success penetrating the U.S. market and vice versa. The report concluded that the Japanese may be more successful in the U.S. once the market settles and Japanese vendors capitalize on their ability to cut costs and improve quality.

"From a hardware perspective, the Japanese have pulled abreast of the U.S. in many areas," the study stated. "But now that the process of catching up has largely been accomplished, Japan faces the much more difficult task of proving that it can become a world economic leader. Given its lack of natural resources, success in information-intensive industries will be the crucial factor in this effort."

The Japan Data Book is available for $375 from International Data Corp., 5 Speen St., Framingham, Mass. 01701.

ALTOS from page 95

piece is missing," Jackson commented in a recent interview here.

That balance was disturbed this spring when the vice-president of manufacturing and the director of marketing both resigned, to be followed a few weeks later by David Hanna, the person Jackson had appointed his successor as chief executive officer only four months earlier.

Citing "philosophical differences," Hanna made way for Jackson to take over the reins once more and implement a strategy that bore little of his own personal imprint.

"David Hanna came in and set the strategy, and I've come back to implement it," Jackson said. "We [each] would have implemented the strategy differently, and it became clear that both of us were not needed here," he added.

Jackson

The management changes caused consternation in some industry circles. "It has been a traumatic episode for the company that has definitely had an effect on the public's perception of Altos. The hope is that it is one of those glitches that last for a short time only," commented Frederick Cohen, senior vice-president at L.F. Rothschild, Unterberg, Towbin, Inc., the New York-based investment firm.

Riding on that hope, Jackson has placed Philip White, a Hanna appointee, in the position of senior vice-president of marketing and a 16-year veteran of IBM in charge of all U.S. marketing and support activities.

Key to the company's new strategy, White said, is the expansion of its current line of Altos 586 and 986 16-bit multiuser, multitasking products.

The chief executive said Altos plans to introduce "a whole slew of products over the next six months" and to counter IBM in the market by emphasizing its own distribution channels and keeping costs down through better inventory control.

However, few industry observers believe the new strategy will be implemented without difficulty. John Kiefer, senior analyst at Infocorp, the Cupertino, Calif.-based market research firm, commented: "Altos is strategically positioned as a low-cost supplier. Their greatest vulnerability has got to be that someone will come along and introduce a lower cost piece of hardware."

Production snafus said to be cause of Macintosh supply lag

FREMONT, Calif. — The supply of Apple Computer, Inc.'s Macintosh computers continues to lag behind demand for the product because of production snags at its custom-built plant, company officials have conceded.

With the Fremont plant currently turning out some 2,000 Macintosh computers a day, the chief responsibility for ensuring their quality rests with Debi Coleman, the factory's director of operations.

"Because the [Macintosh] is a new product, we are learning all kinds of things about its manufacture that it was not possible to know when the product was still in the engineering lab," Coleman said in a recent interview.

Speaking recently at a Future Computing, Inc. seminar, John Sculley, Apple's president, said the company has been forced to shut down the Fremont plant on several occasions in order to prevent subquality Macintoshes from being produced.

"The biggest pressure on us has been to produce large volumes of Macintosh products and, quite frankly, our manufacturing has been slower than we anticipated at this time," Sculley said.

Did not meet standards

The problem, according to Sculley, was due strictly to the fact that some components supplied from outside the company have not met Apple's quality-control standards.

"On those occasions we have consciously chosen to shut down the [Macintosh assembly] line rather than allow less than high-quality products to be shipped out of our plant," he said.

According to Sculley, "We knew we had to learn about automated manufacturing and economies of scale, because as time goes on [they] will play a larger and larger role. Unless we are willing to live with tough decisions like closing down the plant temporarily, we think it will lead to bad decisions in the long run."

One of the things the company learned, Coleman said, is that it neglected to set up audit and test functions prior to launching the Macintosh, and so now Apple is engaged in a massive redefining of component specifications and extensive vendor sampling on-site.

"In the first couple of months, we didn't have the early warning and detection system that we do now, so a lot of time was spent inspecting failed parts. As a result, we are only now reaching the production levels we should have been at months ago," Coleman noted.

'Just-in-time' philosophy

Following Apple's "just-in-time" production philosophy, Coleman has set ambitious goals for cutting down on materials in the plant and increasing the company's inventory turns from its traditional number of three a year to 20.

"We want to have eight days of inventory, 1½ days of work in process and a maximum of one week's pipeline of finished goods worldwide," she said. Coleman said the company is on track for 12 inventory turns in 1984.

To achieve these goals, she added, Apple plans to introduce more sophisticated technology into the Macintosh plant, including replacing its three aging Digital Equipment Corp. PDP-11/70 central processors with a single, nonstop transaction processor, the introduction of robots for printed-circuit board assembly and the perfection of surface-mounted device technologies for making denser, more powerful logic circuits.

PLANT from page 95

components, including the Macintosh's Motorola, Inc. 68000 chip, are then inserted by hand. This, according to production engineer Mike Chisuna, is due to the fact that the company has yet to perfect a technique for automating this function, although the use of robots is currently being considered.

Automated guided vehicles carry the newly assembled boards to the final assembly area, together with an already assembled analog board, brought in from an outside supplier.

From here on out, each Macintosh is built on a flat pallet. Using a handheld automatic screwdriver, workers attach a metal chassis to the front part of the Macintosh, known as the bezel, to which is also attached the CRT, the analog board and a Sony Corp. disk-drive assembly. All the interconnect cables between the disk drive, the analog board and the CRT are then plugged in by hand and the logic board is placed manually in the chassis.

The assembled Macintoshes now perform a series of diagnostic tests on themselves, including memory function, communications circuitry and terminal screen alignment, through the use of a test diskette placed by hand in the Macintosh. If the product is defective, it goes offline for repair, while good parts are sent for burn-in testing.

Macintoshes now enter the critical burn-in test system, manufactured by the Hirata Co. of Japan, by means of an elevator that transfers them into one of seven different levels of conveyer belts, one mile long in total. Here, electrical power burn-in cycles, controlled by a Macintosh computer, are switched on and off every 12 minutes. In all, the Macintosh undergoes 24 hours of burn-in tests, principally memory testing and disk-drive reading and writing tests.

At the end of the burn-in period, the housing is manually secured to the product, the agency approval labels and Macintosh logo are attached by hand and an employee wraps the accompanying mouse, keyboard and accessory kit, including instruction manuals, in a premolded package.

The Macintosh now enters the packaging area, the only part of the plant that is fully automated and requires no labor. Through use of an automated packaging machine, manufactured by Sabel Engineering Corp., a Sonoma Calif.-based supplier, the package is placed in a box and taped, before being sent by conveyer to a Lamson Corp. robo-palletizer where the Macintoshes are assembled in sets of 12 and wrapped.

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September

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Closes August 3

October

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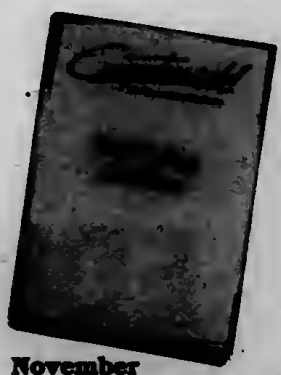
Closes August 31



November

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Closes October 5

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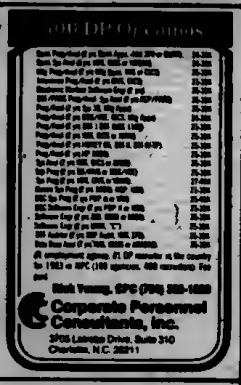

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We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

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POSITION: Court Information Analyst/Programmer Analyst

CLOSING DATE: July [illegible], 1984
LOCATION: [illegible] Circuit Court, Salt Lake City
SALARY: [illegible] - [illegible], plus a generous benefits package.

DUTIES: [illegible]

REQUIREMENTS: [illegible]

RESUMES AND COLLEGE TRANSCRIPTS SHOULD BE SUBMITTED TO:

[illegible]
Salt Lake City, Utah 84111
[illegible]

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For further information please contact Personnel Office,

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Rock Springs, Wy 82902-0428
307-382-2121 ext 122

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Chairman, Search Committee for Director of Academic Computing
Virginia Commonwealth University
Box 16 MCV Station
Richmond, Virginia 23298

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CICS, VSAM, FOCUS

Phoenix
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CICS, IMS DB/DC
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COMPUTER PROGRAMMER AND ANALYST
JOB ORDER NO. 419848

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Technical Specialist—Assist in the development and maintenance of the college's administrative and academic telecommunication network and the local area network. The networks will support voice, data, word processing, mail and video. In addition to the aforementioned qualifications, an electrical tech degree and/or experience in telecommunications desirable.

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VAX SYSTEMS SPECIALIST

Denison University is seeking a VAX Systems Specialist to provide overall technical support and guidance for dual VAX systems in a clustered environment. This challenging position requires a BS in Computer Science or related discipline (MS preferred), in-depth experience as VMS Systems Programmer/Manager and multiple language skills required to support SPSS, MINITAB, SAS, CAS, COBOL, BASIC, PASCAL, FORTRAN, All-In-One, RMS, RDB and Datatrieve.

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[illegible]
Director of Computer Center
Denison University
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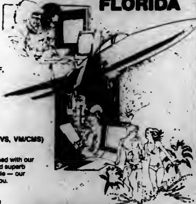

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Cynthia J. Delany,
Classified Operations Manager

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BIDS & PROPOSALS

FOR SALE:

The Board of Regents, University of Nebraska at Omaha, will be accepting sealed bids for:

Data General C-[illegible] Computer System with 1.5 MB memory, 3 ea. AM-16 and 1 ea. AM-[illegible] communications boards, 2 ea. [illegible] disk subsystems and 1 ea. [illegible] disk, and 1 ea. [illegible] tape drive. All equipment available after July [illegible], 1984. All equipment is under DG maintenance and will be provided with a letter of certification from Data General. Prefer to sell as one system but will consider other offers. Terms: certified bank draft upon pickup of equipment. Sealed offers to buy will be accepted until 2:00 p.m. CDT July [illegible], 1984. Contact the [illegible] Manager, University of Nebraska at Omaha, [illegible] Streets, Omaha, NE [illegible]. Call [illegible].

DALLAS COUNTY HOSPITAL DISTRICT

Sealed bids will be received by the DCHD, 5201 Harry Hines Blvd., Dallas, TX 75235 for the sale of the following DP equipment: (2) STC 8650-A2 Disk Drives. Minimum bid is $7,000 per Drive. (2) STC 8650-B2 Disk Drives. Minimum bid is $5,000 per Drive. (1) STC 8880-2 Controller with 2 Channel Switch. Minimum bid is $10,000. Equipment will be available 8/1/84. DCHD reserves the right to refuse any and all bids. Contact Bob Baily or Jim Crutcher at (214) 637-8131.

The Bulletin Board

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6070	[illegible]MB Disc SS	$[illegible]
6042	Dasher [illegible]CPS	$[illegible]
6040	Dasher [illegible]CPS	$[illegible]
[illegible]	Tape [illegible] 9 Trk	$[illegible]
[illegible]	1 Line Synch MUX	$[illegible]
4260 (2)	4 Line Curr. Loop	$[illegible]
[illegible]	8 Line A.L.M.	$1000
[illegible]	4 Line A.L.M.	$[illegible]
4[illegible]1	4 Slot Cam Chas	$[illegible]
4218	300 LPM	$[illegible]
4075 (2)	IO Interface	$[illegible]
4077 (2)	Tabtype IO	$[illegible]
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More Bulletin Board on the next page

The Bulletin Board

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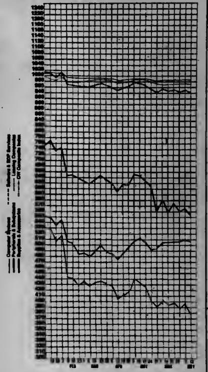

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 11, 1984

All statistics compiled computed and formatted by TRADE QUOTES INC Cambridge Mass 02139

EXCH		1983-84 RANGE (1)	CLOSE JUL 11 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	11- 28	12	0	0.0
O	ALTOS COMPUTER SYST	9- 21	10 3/8	- 1/8	-0.9
N	AMDAHL CORP	11- 38	10 3/4	- 7/8	-7.8
O	APPLE COMPUTER INC	18- 29	28 1/8	+1 1/4	+4.8
N	AT&T	13- 21	17 1/4	+ 1/8	+0.7
N	BURROUGHS CORP	46- 38	50 1/4	+ 1/4	+0.4
O	COMPUTER AUTOMATION	8- 17	5 1/2	- 3/4	-12.0
O	COMPUTER CONSOLES	14- 30	17 3/8	- 1/4	-1.9
N	CONTROL DATA CORP	29- 30	35 1/8	-2	-5.8
O	CONVERGENT TECHNOL	11- 41	11 1/8	-1 3/8	-10.1
N	CRAY RESEARCH INC	38- 30	40 3/8	- 5/8	-1.8
O	DATA TERMINAL CORP	27- 48	40 1/2	-1 5/8	-2.8
N	DATAPOINT CORP	17- 01	19 7/8	-1 0/4	-8.3
A	DIGITAL EQUIPMENT	89-120	90 8/8	- 7/8	-1.9
O	ESCO INC	12- 08	10 0/8	- 3/8	-2.8
N	ELECTRONIC ASSOC.	3- 13	8 7/8	- 5/4	-20.0
O	FLOATING POINT SYST	13- 48	19 3/8	0	0.0
N	FOXBORO	28- 37	30	- 1/8	-1.8
O	GENERAL AUTOMATION	5- 10	8 3/8	- 7/8	-8.9
N	GOULD INC	28- 48	27	+ 0/8	+2.0
N	HARRIS CORP	29- 48	23 1/8	-3 3/8	-8.8
N	HEWLETT-PACKARD CO	40- 48	38 1/8	- 7/8	-2.8
N	HONEYWELL INC	46- 69	48 1/8	-3 3/8	-6.3
N	IBM	100-134	108 1/4	-1 7/8	-1.7
O	IPL SYSTEMS INC	3- 14	8 1/4	+ 1/8	+18.1
O	M/A-COM INC	15- 28	12 1/4	- 1/8	-1.8
O	MANAGEMENT ASSIST	5- 28	28 1/4	-1 1/8	-4.9
O	MATSUSHITA ELEC IND	28- 30	23 1/4	-1 1/4	-1.0
N	MODULAR COMPUTER SYS	5- 10	7 3/8	- 3/8	-4.8
O	MOHAWK DATA SCI	5- 17	19 5/8	- 3/8	-2.9
N	MOTOROLA INC	28- 48	30 7/8	- 3/8	-1.8
N	NAT'L SEMICONDUCTOR	11- 28	12 1/8	+ 1/4	+2.1
N	NBI INC	17- 30	21 0/8	- 3/8	-1.7
N	NCR	29- 38	23 5/8	-1 1/8	-4.2
N	PERKIN-ELMER	28- 27	21	- 1/8	-2.2
O	PRIME COMPUTER INC	11- 28	14	+ 3/8	+2.7
N	SPERRY CORP	38- 30	30 1/8	-1 0/8	-4.8
O	TANDEM COMPUTERS INC	18- 40	22 1/4	- 7/8	-3.8
N	TANDY CORP	29- 38	29 5/8	- 7/8	-5.8
O	TELEVIDEO SYSTEMS	5- 41	8 7/8	- 1/8	-2.0
O	TELXON CORP	9- 48	10 1/8	0	0.0
N	TEXAS INSTRUMENTS	101-130	100 3/8	-8 3/8	-8.1
A	ULTIMATE CORP	10- 24	19 3/4	- 1/4	-1.2
O	VECTOR GRAPHICS INC	1- 8	2/4	+ 1/8	+20.0
A	WANG LABS "B"	24- 38	29 0/8	-1 7/8	-6.8
A	WANG LABS "C"	24- 42	28	-1 3/4	-6.2
N	XEROX CORP	35- 50	38 3/8	- 1/8	-1.0
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CO	28- 38	28	-1	-8.7
N	COMDISCO INC	10- 42	11 1/2	- 7/8	-7.0
O	CONTINENTAL INFO SYS	5- 12	9 1/8	- 1/8	-4.9
O	DPF INC	10- 18	11 3/4	- 3/8	-3.6
O	PHOENIX AMERICAN INC	5- 17	8 0/2	0	0.0
O	SELECTERM INC	11- 21	19	0	0.0
N	U.S. LEASING	28- 44	30 3/8	- 1/8	-1.0
	COMPONENTS				
N	ADVANCED MICRO DEV	28- 37	28 1/8	- 3/8	-2.9
O	AMI SEMICONDUCTOR	19- 38	19 1/8	-3	-13.8
N	ANALOG DEVICES INC	28- 38	23 1/2	- 7/8	-3.9
O	ANALOGIC CORP	19- 31	18 3/8	- 1/2	-4.9
N	APPLIED MAGNETICS CP	11- 27	11 1/8	- 3/8	-8.2
N	TERADYNE	24- 38	28	- 7/8	-3.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1983-84 RANGE (1)	CLOSE JUL 11 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	3- 8	3 1/2	- 1/8	-3.4
O	ADVANCED SYSTEMS INC	10- 23	14 7/8	- 7/8	-5.6
O	AGS COMPUTERS INC	10- 20	12 1/2	-1 3/4	-12.2
O	AMERICAN SOFTWARE	10- 31	13	- 1/4	-1.8
N	ANACOMP INC	8- 10	8 1/4	- 1/8	-5.2
O	ANALYSTS INTL CORP	8- 17	9 3/4	0	0.0
A	APPLIED DATA RES.	10- 27	10 3/4	0	0.0
O	ASK COMPUTER SYSTEMS	13- 21	18 3/4	+ 1/4	+1.3
O	AUTOMATIX CORP INC	1- 7	1 3/8	+ 3/8	+27.2
A	AUTOMATIC DATA PROC	30- 44	30	- 3/8	-1.0
O	CGA COMPUTER ASSOC	8- 17	11 1/8	+ 1/8	+1.9
O	COMPUTER ASSOC INT'L	18- 30	18 3/4	- 3/4	-3.8
O	COMPUTER HORIZONS	7- 30	15 3/4	-1	-12.9
O	COMPUTER NETWORK	3- 11	8 1/4	+ 1/2	+7.0
N	COMPUTER SCIENCES	11- 23	12 1/4	- 1/4	-2.0
N	COMPUTER TASK GROUP	12- 18	14	- 1/8	-0.4
O	COMPUTER ASSOC	5- 10	8 1/4	+ 1/4	+2.7
O	COMPUTONE SYSTEMS	4- 23	4 1/8	- 3/8	-7.8
O	COMSERV CORP	2- 10	8 3/8	+ 1/8	+0.5
O	COMSHARE	7- 18	8 1/4	- 3/8	-4.3
O	CULLINET SOFTWARE	24- 50	28 1/4	-3 1/4	-6.9
O	CYCARE SYSTEMS INC	18- 29	20	+ 1/4	+1.0
N	ELECTRONIC DATA SYST	29- 43	33 0/8	- 1/8	-1.1
O	HOGAN SYSTEMS INC	11- 27	11	-2 3/4	-20.0
N	GENERAL ELECTRIC CO	45- 38	50	-3 7/8	-6.4
N	GTE CORP	38- 48	37 1/2	- 3/8	-1.6
N	INFORMATICS INC	18- 32	21 1/4	-3 1/8	-10.8
O	INFORMATION SCIENCE	8- 17	9	0	0.0
O	INFOTRON SYSTEMS CP	20- 43	20 1/4	+ 1/8	+1.7
O	KEANE ASSOCIATES	9- 19	8 3/4	0	0.0
N	LOGICON	18- 91	28 7/8	+ 1/8	+0.0
O	MSI COMMUNICATIONS	7- 28	7	- 1/8	-1.7
O	MATHEMATICAL APP GRP	8- 18	8 1/2	+ 1/4	+5.8
O	MICRO SYSTEMS INC	31- 50	38	-3	-7.0
O	MONCHIK-WEBER CP	9- 22	7 3/4	-1 1/8	-12.0
O	NATIONAL DATA CORP	14- 28	19 5/8	+ 7/8	+4.8
O	ON-LINE SOFTWARE INT	8- 88	8 1/2	- 1/4	-2.9
O	PANSOPHIC SYSTEMS	11- 18	13 3/4	+ 1/8	+0.8
N	PLANNING RESEARCH	13- 21	14 8/4	- 1/8	-0.8
O	POLICY MGMT SYSTS CP	22- 38	28 7/8	- 5/8	-1.0
O	PROGRAMMING & SYS	6- 8	4 1/8	0	0.0
O	REYNOLDS & REYNOLDS	28- 53	38	- 1/8	-1.7
O	SEI CORP	13- 88	18 3/8	- 1/8	-7.0
O	SHARED MEDICAL SYST	23- 43	28 3/8	- 1/8	-0.8
O	SCIENTIFIC COMPUTERS	8- 14	8 1/4	+ 1/4	+3.1
O	SOFTWARE AG	8- 14	11 1/8	- 5/8	-5.3
N	URS CORP	10- 18	10 1/8	0	0.0
O	UCCEL	7- 17	8 3/8	- 1/8	-5.0
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	5- 7	6	0	0.0
O	ANDERSON JACOBSON	7- 28	8 3/4	0	0.0
O	AUTO-TROL TECHNOLOGY	12- 20	11 1/8	-2	-14.8
O	BRAETEC INC	7- 27	8	- 1/8	-3.0
O	BEEHIVE INT'L	5- 10	2 3/8	0	0.0
N	BOLT,BERANEK & NEW	17- 28	19 3/4	+ 1/8	+0.8
O	CAMBEX CORP	1- 2	1 1/8	+	-8.8
O	CENTRONICS DATA COMP	10- 30	11	-1 3/8	-11.1
O	CETEC CORP	7- 12	7 3/8	- 1/8	-1.0
A	COGNITRONICS	5- 28	8 7/8	- 1/8	-2.9

EXCH		1983-84 RANGE (1)	CLOSE JUL 11 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	3- 8	1/2	0	0.0
O	COMPUTER TRANSCEIVER	3- 10	2 1/8	0	0.0
N	COMPUTERVISION CORP	30- 53	38	-1 1/8	-2.8
N	CONRAC CORP	15- 28	12 3/8	+ 3/8	+6.0
O	DATAPRODUCTS CORP	10- 30	17 0/8	0	0.0
O	DATARAM CORP	9- 19	8 1/4	+ 1/8	+0.1
O	DATA SWITCH CORP	12- 41	12 3/4	- 3/8	-5.8
O	DATUM INC	8- 17	8	- 1/8	-2.4
O	DECISION DATA COMPUT	5- 12	10 1/8	+ 3/4	+7.0
O	DOCUTEL-OLIVETTI	7- 28	8 3/8	- 1/4	-3.0
N	ELECTRONIC M & M	5- 11	8 1/8	- 1/8	-7.5
O	EDUNTA. INC	5- 12	8 7/8	+ 1/8	+1.4
O	EVANS & SUTHERLAND	17- 38	18 3/8	- 7/8	-5.8
O	GANDALF TECHNOLOGIES	5- 19	11 1/8	0	0.0
O	GEN'L DATA COMM IND	10- 17	19 1/8	- 3/8	-1.8
O	GREAT SOUTHWEST IND	1- 3	0/8	0	0.0
O	HAZELTINE CORP	10- 38	24 3/4	- 7/8	-3.4
O	ICOT CORP	2- 8	2 3/4	+ 1/8	+8.4
O	INFORMATION INTL INC	10- 78	11 1/4	0	0.0
O	INTEL CORP	28- 48	30 1/8	0	0.0
O	IPL SYSTEMS INC	5- 14	8 1/4	+ 1/2	+10.1
O	LUNDY ELECTRONICS	7- 28	7 3/8	+ 1/4	+2.9
O	MEGADATA CORP	5- 12	11 3/4	- 3/4	-6.0
O	MSI DATA CORP	11- 23	18 7/8	- 3/4	-6.4
O	ANDREW CORP	19- 38	27 1/2	-1 1/8	-5.1
O	NETWORK SYSTEMS CORP	10- 48	28 0/8	- 7/8	-2.7
N	NO AMERICAN PHILIPS	30- 48	34 1/8	- 1/8	-0.9
N	NORTHERN TELECOM LTD	28- 48	38 1/8	0	0.0
O	ORBEX	1- 8	1/2	- 1/8	-20.0
N	PARADYNE CORP	12- 38	12 3/8	0	0.0
N	PENRIL CORP	5- 58	12 1/2	- 3/8	-5.8
O	PHOENIX GRANDBORN INC	5- 17	8 1/8	0	0.0
O	PLESSEY CO (ADR)	28- 41	27	- 1/4	-0.9
O	QUINTRONIX INC	10- 38	18 1/8	-1	-5.1
O	RAMTEK CORP	5- 23	7 1/8	-1 1/4	-20.4
O	RECOGNITION EQUIP	11- 17	18 3/4	- 3/8	-6.4
N	ROLM CORP	28- 50	37 3/4	-1 3/8	-3.6
O	SANDERS ASSOCIATES	28-100	41 1/4	-1 0/8	-2.7
O	SCAN DATA	1- 8	3/8	0	0.0
O	SCAN-TRON CORP	12- 18	17 1/8	0	0.0
N	SCIENTIFIC ATLANTA	5- 23	8 1/8	- 3/8	-7.1
N	STORAGE TECHNOLOGY	5- 23	8 3/8	-1	-10.0
O	SYKES DATATRONICS	3- 19	8 7/8	- 1/8	-4.1
O	SYSTEMS & COMP TECH	28- 58	28 3/4	+ 3/8	+1.0
N	I ONE INC	7- 17	8 3/8	0	0.0
A	TBM PRODUCTS CO	13- 28	14	+ 1/8	+0.7
O	TANDON CORP	7- 38	7	+ 1/8	-1.8
A	TEC INC	5- 12	8 3/8	- 1/8	-4.9
N	TEKTRONIX INC	58- 67	38	-8	-8.0
N	TELEX	18- 38	27 3/8	+ 0/8	-1.3
O	TESDATA SYSTEMS CP	3- 17	8 1/4	- 1/8	-3.7
O	TIMEPLEX INC	10- 23	14	0	0.0
O	VISUAL TECHNOLOGY	5- 88	8 1/4	- 3/8	-4.8
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 23	28 3/8	+ 1/2	-8.3
N	BARRY WRIGHT	28- 38	38 1/2	+ 1/8	-1.0
A	DUPLEX PRODUCTS INC	23- 27	23 3/4	+ 1/8	-8.8
O	ENNIS BUS. FORMS	28- 58	18 3/4	- 3/8	-1.8
N	3M COMPANY	58- 38	38 1/2	+8 1/8	+1.4
O	MOORE CORP LTD	28- 81	38 1/4	-1 1/2	-8.8
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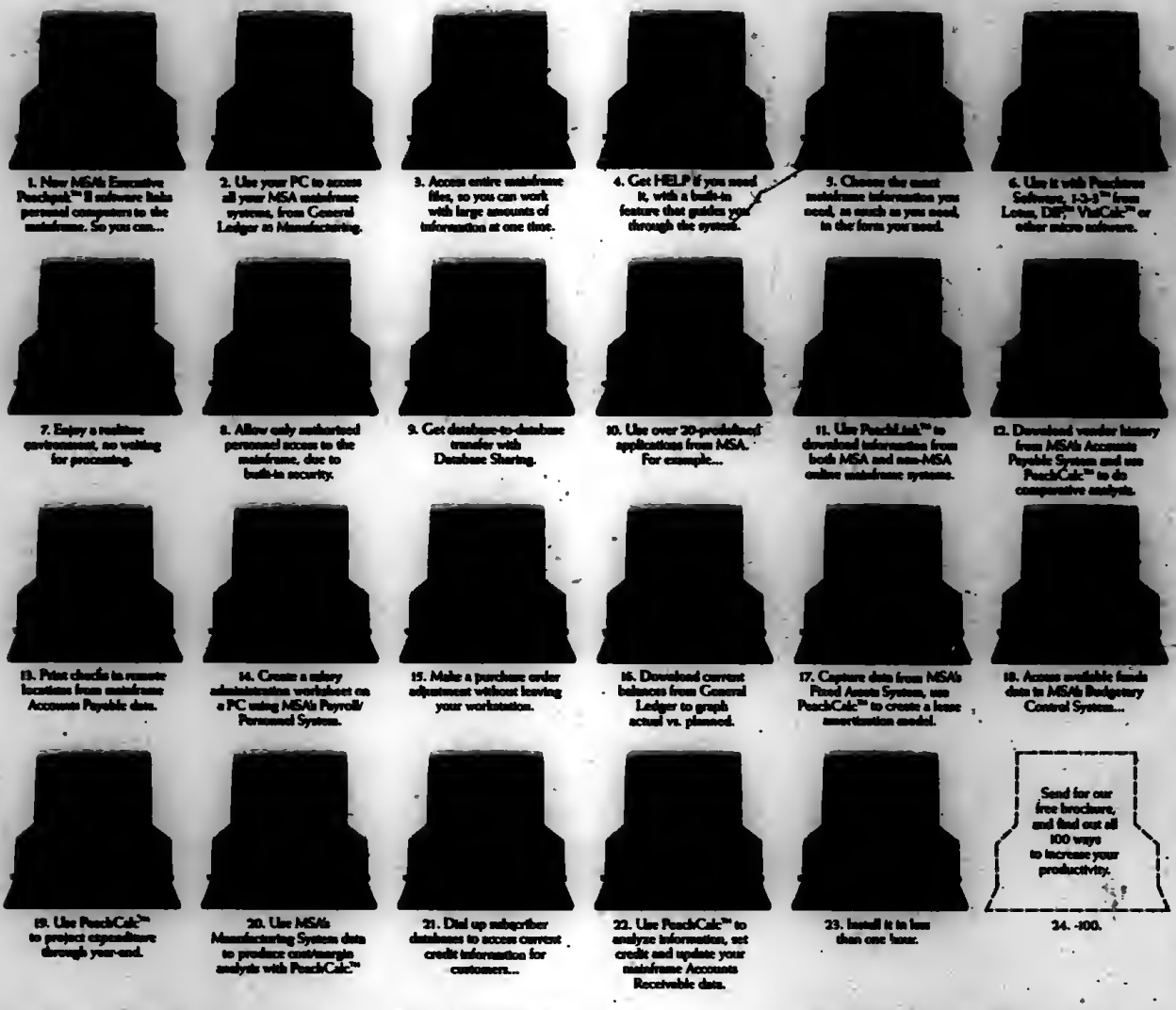

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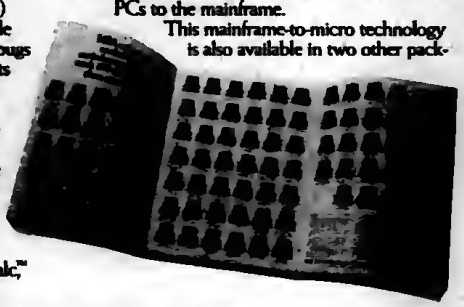
Executive Peachpak II also includes PeachCalc,™ an electronic spreadsheet. A Business Graphics System for color charts and other graphics. Telecommunications that let personal computers talk to each other—or link to resources such as Dow Jones News/Retrieval® PeachText,™ complete report production system that lets executives edit and footnote reports. A List Manager for organization. And PeachLink,™ the software that links your PCs to the mainframe.



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